

In This Issue—Starting and Lighting Systems

MOTOR AGE

Vol. XXX
No. 22

CHICAGO, NOVEMBER 30, 1916

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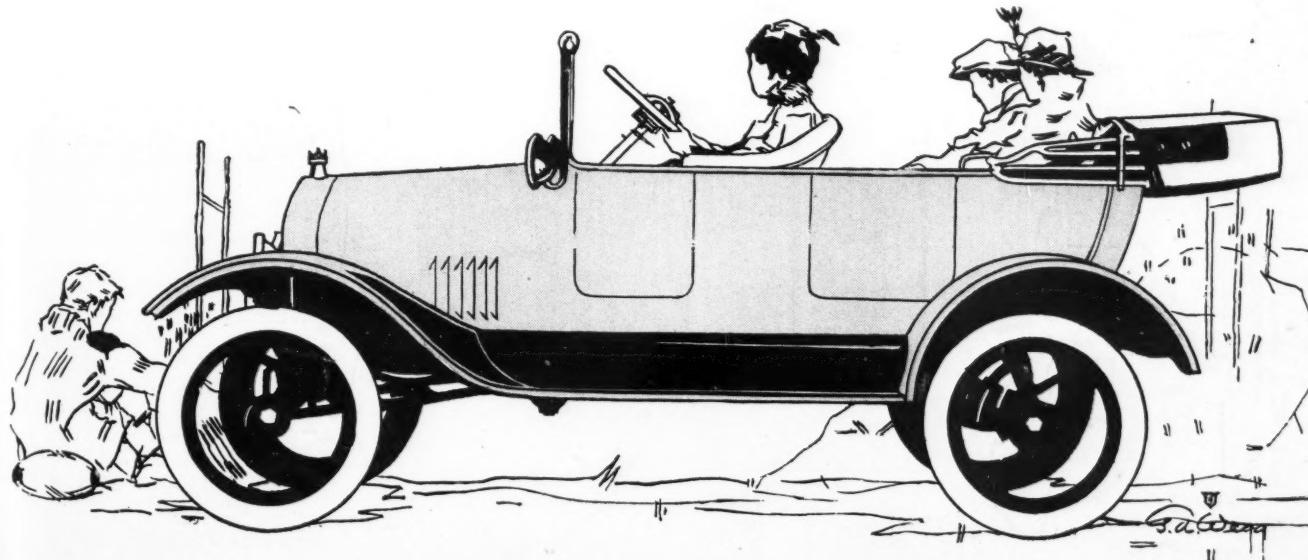
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MOTOR AGE

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Vol. XXX November 30, 1916 No. 22

Contents

ELECTRIC STARTING AND LIGHTING.....	5
ARE MOTOR TRUCKS SUFFICIENTLY TAXED? 12	
New York and New Jersey owners want help from horse-drawn vehicles	
EDITORIAL—THE WINTER LOAD—TAXING MOTOR TRUCKS—ROAD BODIES AND TRAFFIC	14
POEM—RETROSPECT—THEN BE THANKFUL. 15	
RESTA AND AITKEN OUT OF ASCOT..... 16	
Attitude of drivers sours California racing spirit	
STEAL CARS TO ORDER..... 18	
QUANTITY BASIS ELECTRICS..... 19	
ORIENT WANTS MOTOR CARS..... 20	
AMERICA LEADS IN CARS..... 21	
Has more motor vehicles than rest of world	
NASHVILLE-TENNESSEE	30
"The dimple of the universe"	
DEVELOPMENT—JEFFERY SEDAN, SUN 1917 MODELS	45
 DEPARTMENTS	
Motor Car Repair Shop.....	29
From the Woman's Viewpoint.....	36
Readers' Clearing House.....	40
The Accessory Corner.....	48
From the Four Winds.....	50
Among the Makers and Dealers.....	51

ANNOUNCEMENTS

The leading feature of Motor Age for December 7 will be the racing review of the year which will tell how the A. A. A. championship was won and follow the contenders for speed honors from the start of the season to the end.

The developments of a year and what the makers are offering in ignition systems for the motor car will be featured also in Motor Age.



PRECEDENT is a safe guide, even to the expert. And the fact that practically all the manufacturers of cars of the better class and known service capacity use "**NORMA**" equipped magnetos, lighting generators and starting motors, is an excellent reason why you will be conserving your own interests in doing likewise.

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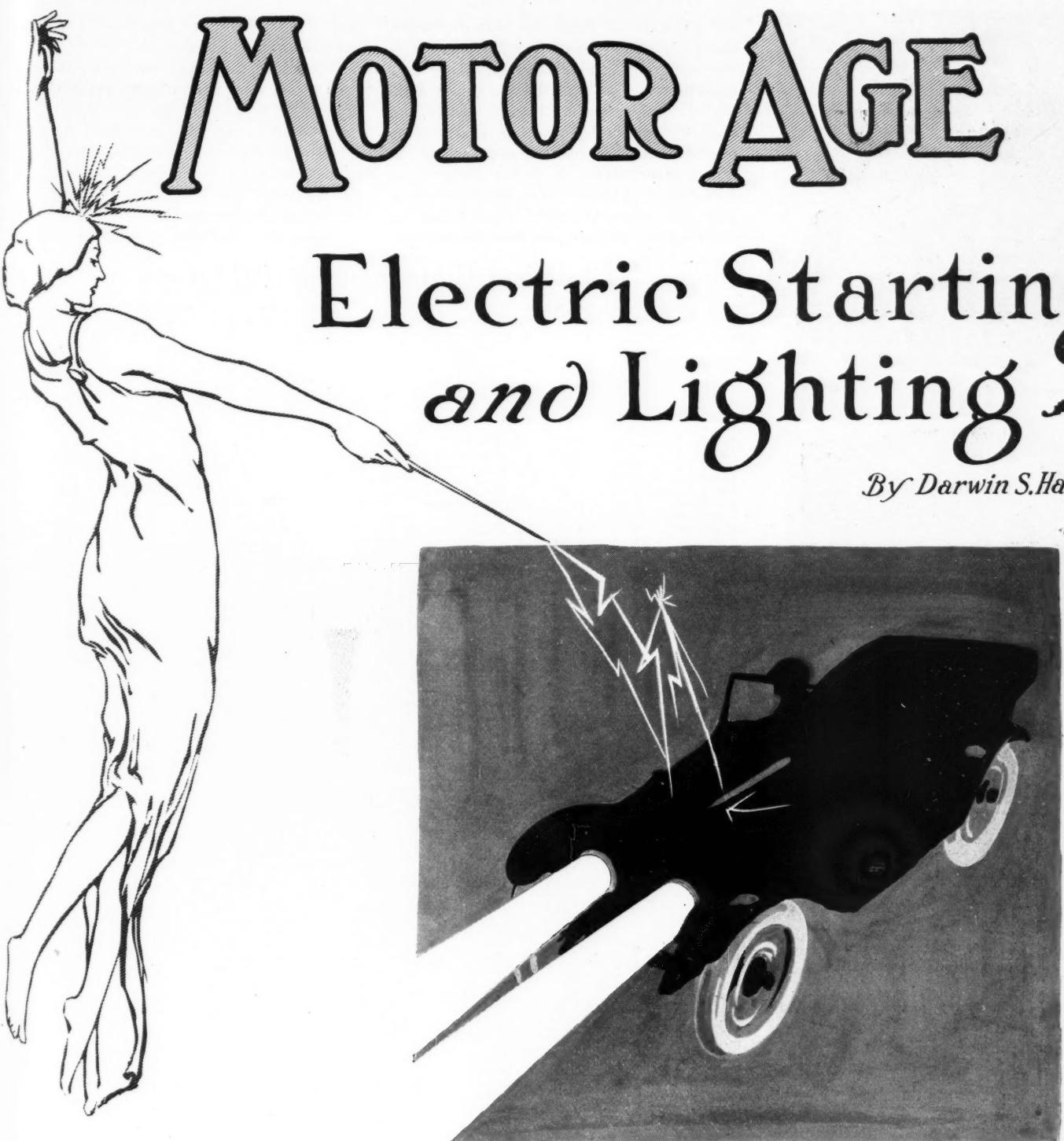
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MOTOR AGE

Electric Starting and Lighting

By Darwin S. Hatch



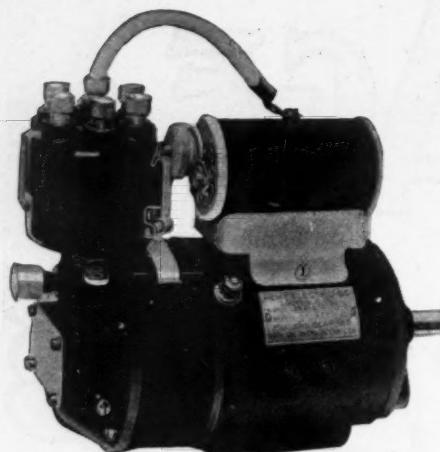
OWNERS of 1917 model cars will find that the electrical portions of their new vehicles have progressed to perhaps a greater extent than many of the other features of the car. This progress is evidenced particularly in the efforts of the car manufacturers and the makers of the electrical equipment to decrease the amount of attention required by the owner, and to make this periodical attention in the matter of oiling and so on more easy of performance. Particularly in the arrangements for lubrication have the manufacturers of starting, lighting and ignition apparatus shown regard for the owner-driver. Very rarely is it necessary now for a number of housings to be removed before the two or three oiling points about the

Systems Are Easier to Care for and Suc- cessful Operation Now Up to Owner

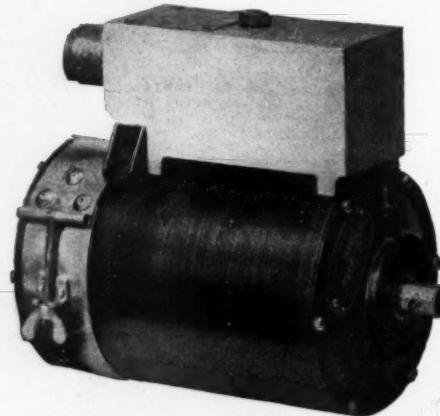
motor or generator can be reached. Also, these points have been located now so that this can be accomplished without the attendant becoming a contortionist. Manufacturers of the motors and generators have arranged their mountings so that the points which must be got at periodically are not hidden behind the instrument itself or some of the other accessories of the

engine. Most of the troubles of owners with electric starting and lighting apparatus is due to too little or too much oil. It's easier to follow the oiling directions in the new cars, but just as important.

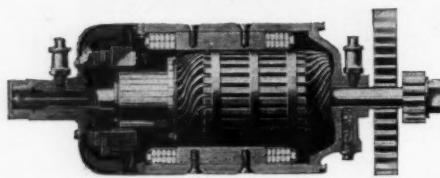
In providing for a more complete and less difficult lubrication of the generator from the standpoint of the owner, manufacturers of electrical apparatus have devised forms of lubricators similar to the wick lubricators which not only assure an adequate supply on the bearing, but the fresh oil is added only at long intervals, but also to make over-oiling impossible. Most of the troubles with electric generators nowadays come from either under-oiling or over-oiling. Ball bearings are still very much in favor but some of the manufac-



Remy generator with ignition distributor and coil



Bijur generator with voltage regulator mounted on its top



Bosch starting motor showing oiling spots and internal construction

turers are tending to plain bearings and there has been developed a type of oilless bearing which is a compound metal and graphite bushing and which could be run dry for a considerable time without damage.

Another feature which will be appreciated by the car owner is the fact that the lighting and starting units are somewhat lighter in general, but at the same time, are sturdier, in that by the use of a more compact construction and better materials it has been possible to reduce both the weight and the size of the units without sacrificing anything in the way of the life of these units.

The starting motors themselves have undergone very little change either mechanically or electrically. There have been some minor improvements towards more compact and rugged armatures and at the same time somewhat less metal in the housing. The motor is such a simple mechanism that there is unlikely to be any radical changes in this instrument.

There has been more improvement in

the generators. From the manufacturers' standpoint they have been improved by the reduction of models produced by each manufacturer so that the generator makers can specialize on fewer designs and thus employ rapid-production machinery to a greater extent, and the saving thus obtained incorporated in better designs and materials. In every case this concentration has quite naturally been based on the type which has proven most efficient

and the improvement has been a case of survival of the fittest.

Instead of the heavy castings and forgings which were part of the ponderous machine 2 or 3 yrs. ago, the reduction in the number of models has permitted the electrical manufacturers to equip their factories with tools which turn out stampings and forgings and thus save a remarkable percentage of the weight.

Regulation of the generator output

Electrical Equipment of 1917 Cars

CAR	MODEL	IGNITION	STARTER		GENERATOR	NO. WIRES	LAMP VOLTAGE
			MAKE	VOLTAGE			
Abbott	6-44	Remy	Remy	6	Remy	1	—
Aland	14-60	Eisemann	U.S.L. Spec.	6	U.S.L. Spec.	1	—
Allen	37	G. & D.	W'house	6	W'house	1	7
American	A	Bosch	Gray & Davis	6	G. & D.	1	6
Ams Sterling	1917	West'house	Bosch	12	Bosch	1	12
Anderson	200		W'house	6	W'house	1	6-7
Apperson	6-17	Remy	Bijur	6	Bijur	2	—
Apperson	8-17		Bijur	6	Bijur	2	—
Auburn	6-39		Remy	6	Remy	1	—
Austin	6-44		Delco	6	Delco	1	7
Bell	17	At-Kent	Delco	6	G. & D.	1	6
Biddle	D	Tension M.	G. & D.	6	G. & D.	1	6
Brewster	1 Stand.	Bosch	U. S. L.	12	U.S.L.	1	6
Briscoe	B A-24	Conn.	Splitdorf	6	Splitdorf	1	6
Buick	1-6-44-45-46-47D	Delco	Delco	6	Delco	1	6
Buick	D-4-34. D-4-35	Delco	Delco	6	Delco	1	6
Bour-Davls	1917	Remy	Remy	6	G. & D.	1	7
Cadillac	Type 55	Delco	Delco	6	Auto-Lite	1	—
Cameron	1917	G. & D.	G. & D.	6	Auto-Lite	1	7
Case	T-17	Conn.	Auto-Lite	6	W'house	1	—
Chalmers	6-30	Remy	W'house	6	W'house	1	—
Chandler	17	Bosch	G. & D.	6	G. & D.	1	—
Chevrolet	490	Conn.	Auto-Lite	6	Auto-Lite	{1}	—
Chevrolet	D	Conn.	Auto-Lite	6	Auto-Lite	2	6
Chevrolet	F5-F2	Conn.	Auto-Lite	6	Auto-Lite	{1}	6
Crow-Elkhart	CE-35	Conn.	Dyneto	—	Dyneto	1	6
Cunningham	V	W'house	W'house	6	W'house	1	4-15
Daniels	8 A	W'house	W'house	6	W'house	1	6
Davis	Light Six	Delco	Delco	6	Delco	1	6-8
Davis	Big Six	Delco	Delco	6	Delco	1	6-8
Detroiter	Six-45	Conn.	Auto-Lite	7	Auto-Lite	1	3 1/2-7
Dispatch	G	Bosch	U. S. L.	12	U.S.L.	2	4-24
Dixie	F. 1917	Conn.	Dyneto	6	Dyneto	1	6
Dodge	—	Delco	N. E.	12	North-East	1	16
Dorris	1-B-6	Bosch	W'house	6	W'house	1	6
Dort	9	Conn.	W'house	—	W'house	1	7-6
Drexel	R-30-35	Bosch	Bijur	6	Bijur	1	6
Drummond	B17	W'house	W'house	6	W'house	2	6
Eclair	D. E. F.	Delco	Dyneto	6	Dyneto	1	6
Elgin	6	Remy	Wagner	6	Wagner	1	6-8
Empire	70	Conn.	Auto-Lite	6	Auto-Lite	1	3 1/2-7
Empire	45	Auto-Lite	Auto-Lite	6	Auto-Lite	1	3 1/2-7
Enger	60 R.	Conn.	Auto-Lite	6	Auto-Lite	1	3 1/2-7
Fiat	55-E-17	W'house	W'house	6	W'house	1	6
Ford	T.	Ford	—	—	—	—	8
F. R. P.	45 a	Bosch	Bosch	12	Bosch	1	12
F. R. P.	45 A	Bosch	Bosch	12	Bosch	1	12
Franklin	9	At-Kent	Dyneto	12	Dyneto	2	8-14
Geneva	—	Eisemann	W'house	6	W'house	1	6
Glide	Light 6-40	W'house	W'house	6	W'house	1	7
Grant 6	8-K	Remy	Wagner	6	Wagner	1	6
Hackett 4	21 A	G. & D.	G. & D.	6	G. & D.	1	6
Hal 12	A-1	W'house	W'house	6	W'house	1	6
Harroun	H.	Conn.	W'house	6	W'house	1	14
Hartfield	4-27	Conn.	W'house	12	Disco	1	12
Harvard	12-40	Delco	Wagener	6	Wagener	1	6
Haynes	37	Remy	Leeece-Neville	6	Leeece-Neville	2	7
Haynes	36	Remy	Leeece-Neville	6	Leeece-Neville	2	6
Hollier 178	—	Apple Co.	Leeece-Neville	6	Leeece-Neville	2	6
Hollier	—	Allis-Chal.	Apple Co.	6-12	Apple Co.	—	6
H. Laughlin	1917	Delco	Allis-Chal.	6-12	Allis-Chal.	—	6
Howard	N. U.	Delco	Disco	12	Disco	1	6
Hudson	N.	At-Kent	Delco	6	Delco	2	6
Hupmobile	Super 6	At-Kent	W'house	6	W'house	1	4-7
Hupmobile	N. P.	At-Kent	W'house	6	W'house	1	4-7
Hupmobile	N. Q.	At-Kent	W'house	6	W'house	1	4-7
Inter-State	T	Remy	West'house	6	W'house	1	4-7
Jackson	349	Auto-Lite	Remy	6	Remy	1	2-6
Jeffery	671	Bijur	Auto-Lite	6	Auto-Lite	1	6-8
Jeffery	472	Bijur	Bijur	6	Bijur	1	7 1/2-8
Jones 6	26B	Dixie	Bijur	6	Bijur	1	6-8
Jordan	60	Bosch	Bijur	6	Bijur	1	7 1/2
Kent	A	Bosch	Bosch	12	Bosch	1	4-18
King 8	E	At-Kent	W.-Leonard	6	W.-Leonard	1	6-8
Kline Kar	6-38F	W'house	W'house	6	W'house	1	7
Kissel 6	42	Eisemann	Kissel	6	W'house	1	2-18
Kissel	100 pt. 6	Remy	Kissel	6	Remy	1	2-3-18
Lambert	90 & 80	Conn.	Conn.	6	Dixie	1	6
Laurel	35	Conn.	W'house	6	W'house	1	7
Lexington	6-0-17	Conn.	W'house	6	W'house	1	7
Lexington	6-p	Conn.	W'house	6	W'house	1	7

which several years ago was one of the chief worries of the motor car owner and one which was little understood, now can be left almost wholly in the hands of the system itself. It is very rare now for the owner to find it necessary to change his charging rate with the change of season, as one time was thought necessary. This comes about from two reasons.

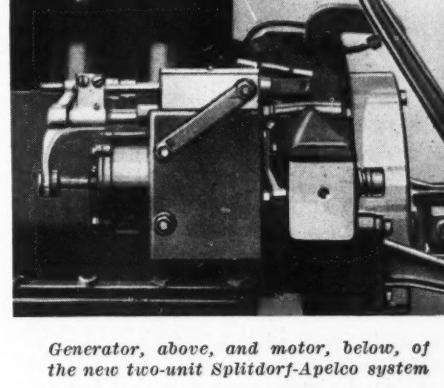
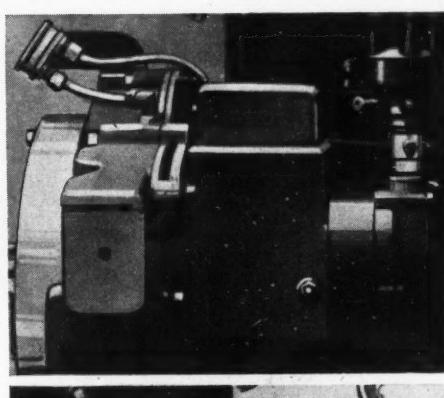
One is because storage batteries have been so greatly improved that they can

stand without damage a considerable wider range of charge and discharge than formerly was possible. Secondly, the regulation design incorporated in the generator itself is quite generally such that the condition of the charge of the battery combined with the lighting load on the generator determines the rate of charge from the generator. This makes the regulation practically automatic.

This comes about to some extent through

Electrical Equipment of 1917 Cars

CAR	MODEL	IGNITION	STARTER		GENERATOR	NO. WIRES	LAMP VOLTAGE
			MAKE	VOLTAGE			
Liberty 6	10-A	Delco	Delco	6-8	Delco	1	6-8
Locomobile	38R-7	Eisemann	W'house	6	W'house	1	6-8
Locomobile	48M-7	Eisemann	W'house	6	W'house	1	6-8
B. B. Luverne	17	Bosch	Bosch	12	Bosch	2	6
Madison	4	Remy	Remy	5-7	Remy	1	6-7
Madison	—	Remy	Remy	6	Remy	1	6
Madison	5	Remy	Remy	6-7	Remy	1	6-7
Madison	7	Remy	Remy	6-7	Remy	1	6-7
Madison	6, 1917	Bosch	W'house	6	W'house	1	6
McFarlan	1917	Bosch	W'house	6	W'house	1	6
Malbom	A	At-Kent	Disco	12	Disco	1	12
Mar'n H'dley	6-40A		W'house	6	W'house	1	7
Mar'n H'dley	6-60B		W'house	6	W'house	1	7
Marmon	34	Bosch	Bosch	12	Bosch	1	12
Maxwell	25	Simms	Simms-Huff	12	Simms-Huff	1	6
Mercer	22-75	Bosch	U.S.L.	12	U.S.L.	1	12
Metz	25	Dixie	G. & D.	6	G. & D.	1	—
Mitchell	C-42	Conn	W'house	6	W'house	1	6-8
Mitchell	D 40	Conn.	Splitdorf	6	Splitdorf	1	6-8
Monitor	T. C. R. R.	Heinze	Heinze	6	Heinze	1	6
Monroe	M-4	Conn.	Auto-Lite	6	Heinze	1	4-6
Monroe	M-3	Heinze	Auto-Lite	6	Auto-Lite	1	6
Monotir	T. N. R. O.	Conn.	Heinze	6	Auto-Lite	1	4-6
Moline-K.	G. M. K. 50	Conn.	Auto-Lite	6	Wagner	1	6
Moline-K.	M. K. 40 C.	Dixie	Auto-Lite	6	Wagner	2	6
Moore	30-35	Delco	Disco	6	Disco	1	6
Moon	6-43	Delco	Delco	6	Delco	1	7
Moon	6-66	Dixie	Delco	6	Delco	1	7
Murray	70 T	Conn.	W'house	6	W'house	1	6
Napoleon	30	Dixie	Dyneto	6	Dyneto	1	6
National	Highway Six	Dixie	W'house	6	W'house	1	2-4-18
National	Highway Twelve	Delco	W'house	6	W'house	1	2-4-15
Oakland	50	Delco	Delco	6	Delco	1	7
Oakland	34	Bosch	Delco	6	Delco	1	7
Ogren Six	102		W'house	—	W'house	2	6
Overland	85-6	Bosch	Auto-Lite	6	Auto-Lite	2	3-6
Overland	85-4	Bosch	Auto-Lite	6	Auto-Lite	2	3-6
Owen	M-25	Bosch	Owen-Mag.	24	Owen-Mag.	12	12
Owen	O-36	Bijur	Owen-Mag.	24	Owen-Mag.	28	28
Packard	2-25 2-35	Remy	Bijur	6	Bijur	2	7
Paige	Fleetwood 6-38	Conn.	G. & D.	6-8	G. & D.	1	6-8
Paige	6-46 Fairfield	Conn.	G. & D.	6-8	G. & D.	1	6-8
Partin-Pal.	32	Conn.	Disco	6	Disco	1	6
Partin-Pal.	20	Delco	Allis-Chal.	6	A-C.	1	6
Paterson	6-45	Delco	Delco	6	Delco	1	3 1/2-12
Pathfinder	2B TC-2C	Rdstr.	Delco	6	Delco	1	6
Peerless	56 T2	At-Kent	G. & D.	6-7	G. & D.	1	6-7
Phianna	M	Bosch	W.-Leonard	6	W.-Leonard	2	—
Pierce Arrow	48-B-4	Bosch	W'house	6	W'house	1	6-7
Pierce-Arrow	38-C-4	Bosch	W'house	6	W'house	1	6
Pierce-Arrow	66-A-4	Bosch	W'house	6	W'house	1	6-7
Pilot	6-45	Delco	Delco	6	Delco	1	6
Premier	6B	Delco	Delco	6	Delco	1	6-8
Princess	4-36F	Splitdorf	Disco	6	Disco	2	6
Pullman	424-32	Dixie	Splitdorf	6	Splitdorf	—	6-7
Regal	J	Heinze	Heinze	6	Heinze	1	6
Regal	F	Dyneto	Dyneto	12	Dyneto	1	—
Reo	M	Remy	Remy	6	Remy	2	3-4, 6-8
Reo	R	Remy	Remy	6	Remy	2	3-4, 6-8
Richmond	6-17 Sp.	Delco	Delco	6	Delco	1	6
Richmond	4-35	Splitdorf	Apple	6	Apple	1	6
Roamer	—	Bosch	Bijur	6	Bijur	2	—
Ross 8	C	A.-K.	W.-Leonard	6	W.-Leonard	1	4-6
Saxon 4	B-5-R	A.-K.	Wagner	6	Wagner	1	6
Saxon 6	S-4	Remy	Wagner	6	Wagner	1	6
Scripps-Booth	D	Remy	Wagner	6	Wagner	1	2-4-16
Simplex	No. 5	Else. & Bos.	Bosch	6	Bosch	1	3 1/2-4-7
Singer	17		W'house	6	W'house	1	—
Standard 8	E	W'house	W'house	6	W'house	1	3-6
Standard 8	F	Splitdorf	Apple	6	Apple	1	6
Stearns	S. K. L. 4-32	Remy	W'house	12	W'house	1	12
Stearns	S. K. S. 33	Remy	W'house	12	W'house	1	12
Stephens	60-65	Conn.	Auto-Lite	6	Auto-Lite	1	2-3-6
Stutz	R	Bosch	Remy	7-8	Remy	2	7-8
Studebaker	S. F. 4-40	Remy	Wagner	6	Wagner	1	7
Studebaker	E. B. 6-50	Remy	Wagner	6	Wagner	1	7
Sun Light	6-17	Remy	Remy	7	Remy	1	7
Velle	B. W. 6-28	Remy	Remy	6	Remy	1	6-3
Velle	B. W. 6-27	Remy	Remy	6	Remy	1	6-3
Westcott	S. 17	Delco	Delco	6	Delco	1	7-3 1/2
Willys Six	88-six	Conn.	Auto-Lite	6	Auto-Lite	2	6-3
Willys Knight	88-4	Conn.	Auto-Lite	6	Auto-Lite	2	6-3
Winton Six	33	Bosch	Bijur	6	Bijur	1	7-1/2
Winton Six	48	Bosch	Bijur	6	Bijur	1	7-7 1/2
Woods	Dual P	Remy	Disco	6	Disco	1	6
Yale 8	—						



Generator, above, and motor, below, of the new two-unit Splitdorf-Apelco system

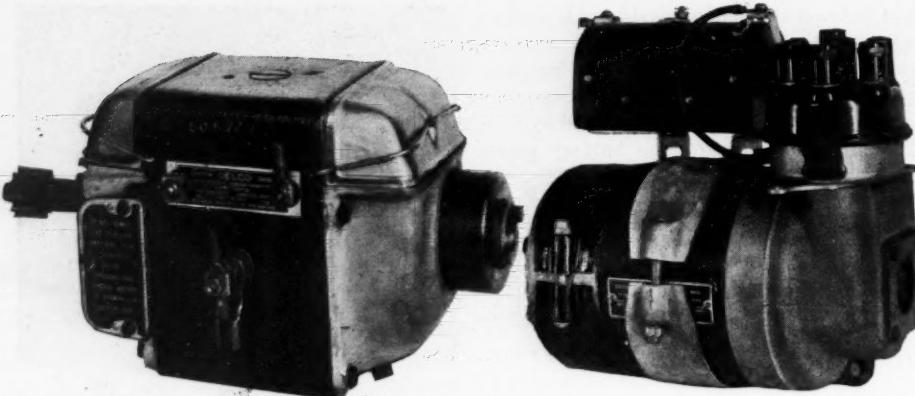


Dyneto combined ignition and generator unit

the more general adoption of what is known as the third-brush regulation, a system which has been explained and illustrated in detail in earlier issues of Motor Age, in the series on the Electrical Equipment of the Motor Car. Also, through the adoption in some instances of other types which accomplish the same effect, such as some of the vibrator controllers. One of these is the new Remy thermostatic regulation which is explained more in detail later.

The employment of a single instrument for both the generation of the current and for the engine starting as well has been superseded to a great extent by the use of separate generators and motors. Sometimes these are combined mechanically, having two instruments in one housing, but in practically every case they are separated both electrically and in their manner of connection to the engine. This has become necessary due to the increase in crankshaft speeds of engines.

It is quite generally accepted that beyond a certain armature speed the gen-



Representing two of the Delco systems. At left, is the motor-generator for separate ignition as used in the Hudson, and at the right is the ignition and generator to be used with a separate starter motor

erator is not economical, and in cases where the engine runs at speeds of 2,000 r. p. m. or better it is unusual to find single-unit systems, except in a few which are connected with the crankshaft at the generator and operate through a reduction gear when starting the engine. This then confines a single-unit instrument with a constant gear connection to the camshaft to fairly low-speed engines. In other words, it has been found almost necessary that the generator armature should be revolved at a very much lower speed than the motor armature.

One Vs. Two-Unit Systems

The unit has to run at a higher speed than would be necessary were it only a generator. This is because the speed of rotation as a motor determines the cranking effort. If there is a 3 to 1 gear ratio between the armature and the crankshaft a much larger electrical machine is necessary than if we have a 20 to 1 ratio, which is easy to obtain if the cranking is done through the flywheel. In one or two cases the difficulty has been overcome by arranging a special form of drive so that the armature is driven at one speed when operating as a generator, and at a very much higher speed when it becomes a motor. The Delco method of driving the armature from one end through an over running clutch when it is a generator, and make it drive through the flywheel from the other end when it is cranking is the best example which really gives the effect of the two-unit system with a single electrical unit.

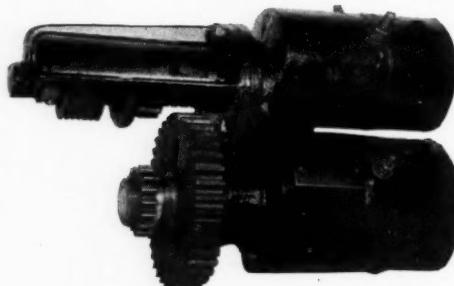
The Splitdorf starting and lighting systems for this year have been redesigned and instead of a single unit system are all two-unit systems for the new season.

A mechanical combination of two units arranged one above the other in a double deck formation is favored in some quarters. For application to cars not fitted with electrical equipment originally, it has the advantage of demounting and the attachment is simplified. A number of the special Ford equipments are of this type. John O. Heinze Co. has just brought out a new Heinze-Springfield for Fords in which the starting motor is above the generator and operate through the Bendix drive.

The Wagner equipment on the Saxon

four-cylinder car is double-deck with the starting motor driving through the generator by means of a Bendix gear and through the generator to the crankshaft by chain.

Bendix drive for the starting motors is used in a majority of the installations and there are one or two others which use a somewhat similar arrangement which gives the same effect of automatic connection



Wagner double-decker two-unit system, showing the Bendix drive of the motor through gears on the generator shaft to give proper reduction

and dis-connection between the motor and the engine flywheel. One of these uses an electro-magnetic pull which moves the piston into mesh with teeth cut on the flywheel.

So far as ignition and generator functions are concerned the tendency this year is just the opposite from that observed in the generator and motor arrangement. There is a very marked tendency toward combining the ignition distributor with the generator. This has the advantage of eliminating one drive from the engine and also usually puts a distributor up where it is well toward the top of the cylinder and thus reduces the length of the ignition high-tension line to the spark plugs, at the same time putting it in a more accessible location. There is also an advantage in the fact that the timing is made possible of a very fine adjustment, because the fine teeth in the drive for the vertical shaft is different from that of the driving gear through the generator and permits a differential setting. Most of the distributors are mounted on the upper end of a vertical shaft and will permit the use of different makes of distributors, so that neither the manufacturer nor the motorist is limited to the employment of only the ignition apparatus turned out by the manufacturer of the generator.

There have been very little changes in the car speed at which the generators commence to charge. This, of course, depends somewhat on the motor speed, but most of the manufacturers find that the system should be able to carry a full lamp load at speeds of from 12 to 15 miles an hour. The point of commencement of charge from the generator depends upon the electrical design, that is, how rapidly it comes up to its full output.

Most of the generators now are geared to be operated at 1½ times the speed of the engine crankshaft.

Development by Makers

Bijur equipment comprises three different generators and four different motors. Six of the generators are the third-brush type and three are for constant voltage regulation. These units all have been lightened slightly during the past year.

Bosch systems comprise a wide variety



Two Westinghouse units. Above is the motor used by Pierce and Locomobile; below is the generator used on the Hupmobile

of models for different installations. In fact there is a larger number than there was last year, and most of the new ones are lighter than those of last year.

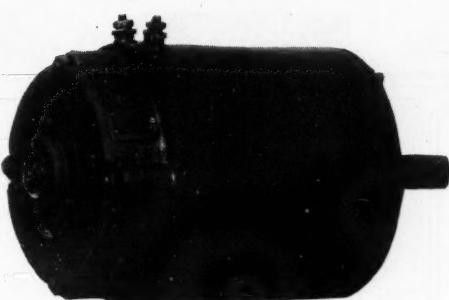
Leece-Neville has incorporated within its generator the features whereby the output may be adjusted to conform to the individual requirements of each car by turning the thumb nut on the outside of the machine. A special generator of 250 watts is made for the White.

Westinghouse starting and lighting outfits for 1917 have been reduced so far as the number of models is concerned. The new offerings include four different models of generators and motors, which is fewer than during 1916, also by re-designing a distinct saving in weight has been effected. Regulation is taken out of the list of items which the motorist has to watch, for the automatic cut in switch is sealed, though adjustment may be made by the manufacturer when necessary.

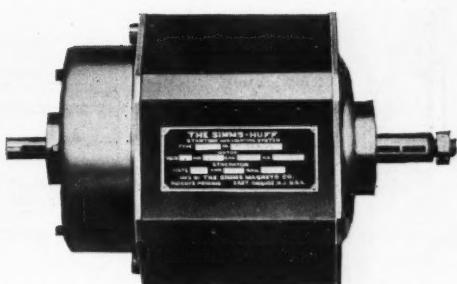
Few changes have been made in the Wagner starting and lighting system, except for the slight variations that are made necessary by new installations. All of these equipments are two-unit, six-volt and all, with the exception of three installations, apply the Bendix drive. All the generators use the third-brush regulation. In all generators and starting motors the commutators are accessible through a simple metal band which snaps in place and is easily moved.

As mentioned above, Splitdorf has developed a new two-unit system which now is stock equipment on the Briscoe cars and the new Mitchell.

Northeast is at present making but one



New Delco motor, a distinct departure in shape for this make



Simms-Huff motor-generator. This is used on the Maxwell

almost the same form as previously, except that it is single instead of double starting wiring.

Auto-Lite systems are all very similar in the motor, the only difference being in the size of the frames and windings. The generators are all of the 6-volt type and the method of controlling the output is the same on all of the older types of generators. Some of the later models on the late 1916 and 1917 cars use the third-brush regulation. The old type of control is through a reversed series winding or bucking field. Bendix drive is used on all motors.

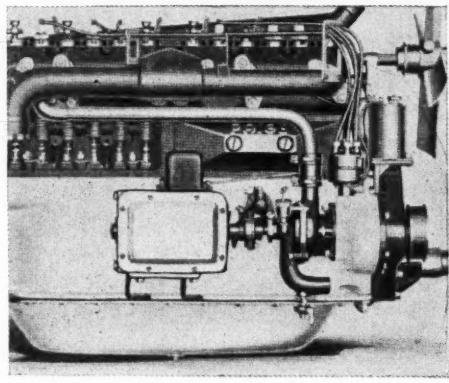
Dyneto equipment is made for both single-unit and two-unit installations. The single-unit system is now in its third year without change, but a new generator replaced the old type and weighs 2½ lbs. less. Third-brush regulation is employed on the generator.

U. S. L. motor generators are made in five models, but all variations of the one general type in which the flywheel is replaced by removing part of the motor generator. A new arrangement known as the elson U-S-L starter type is mounted at the front end of the engine just behind the radiator and opposite to the usual flywheel location. This makes the unit more accessible and also it is the belief of the concern that the armature weight in this position tends to balance the engine's moving parts better than with all the weight at the rear.

Ward-Leonard Automatic Dynamo

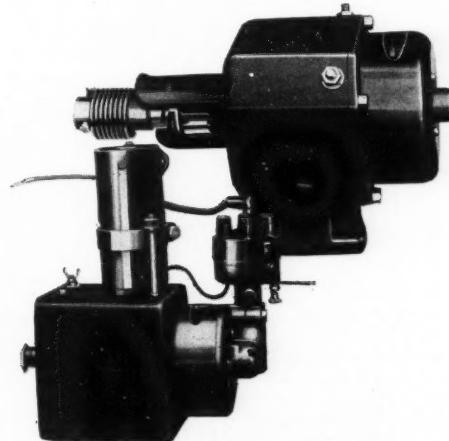
Ward-Leonard is not selling complete starting and lighting systems at the present time, but is manufacturing the Ward-Leonard automatic dynamo control which is being incorporated in a large number of the systems on the market. A feature of this control is the constant current charging system by which the dynamo charges the battery at a constant figure of 10 amps.

Deleo apparatus can be divided into four classifications. One a single-unit starting, lighting and ignition system with the ignition integral with the motor generator, such as is used by Buick. Second: The single-unit system of starting and lighting with separate ignition such as Cadillac and Hudson use. Third: The two-unit starting and lighting system with the ignition combined with the generator and a separate starting motor

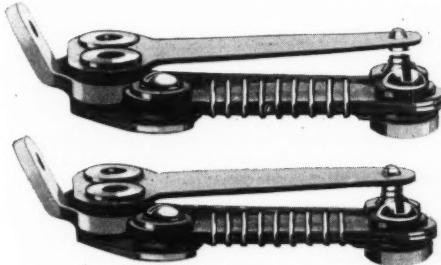


Cray & Davis generator as applied to a Paige

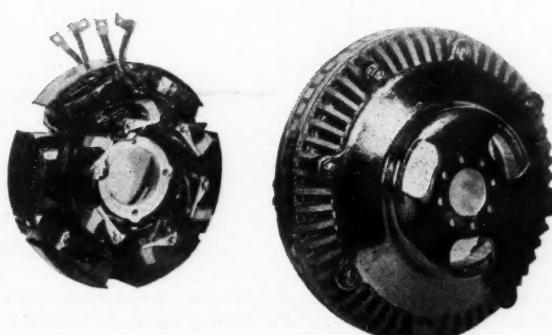
model, this is of the single-unit type and its regulation is of the third-brush type combined with a reversed series steel. Dodge Bros. car, a good example of the Northeast installation, uses this model in



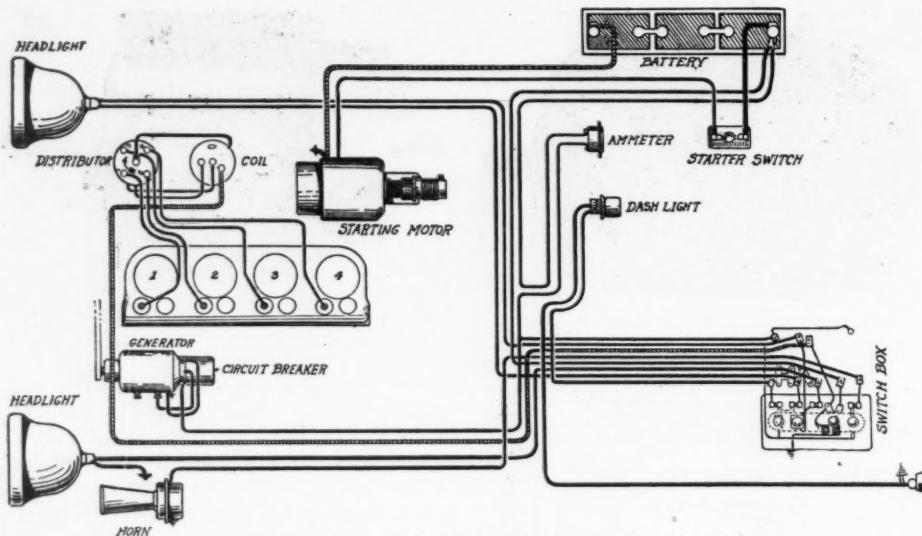
The two new Auto-Lite units, the motor above and the ignition and generator combined, below



Remy's innovation, a thermostatic regulator which controls the output of the generator actuated by the heat of the generator, cutting resistance in and out automatically. This will be explained at length in a later issue



U-S-L flywheel unit motor-generator. The revolving field, in the center, replaces the flywheel. In the latest design this is fitted on the front end of the crankshaft



AUTO-LITE SYSTEM ON OVERLAND MODEL 85

The lighting and starting wiring systems are independent of each other and are easily recognized by the fact that the starter wiring is of heavy round single conductor cable, while the lighting wiring is of much smaller single strand armored cable. If for any reason the tail light is extinguished the instrument light will go out also, giving instant warning of the trouble

such as used by Oakland, Moon, Wescott, Davis and Liberty. Fourth: The two-unit starting and lighting system with separate ignition such as the Pathfinder, Cole and Oldsmobile use. Different installations require slight variation, but in principle they are alike. The standard form of regulation is by means of the third-brush and all of these are adjustable between outputs of 12 to 22 amps.

The Remy Electric Co. has developed a new system of generator control which will be incorporated in the 1917 Reo cars, and on several other cars. The feature of the device is the thermostatic regula-

tor which is operated by the heat produced in the generator. This is used in connection with the third-brush principle of regulation and is located close to the commutator which is the warmest part of the generator. Except for the regulation, the Remy system has not undergone any specific changes. All the new Remy generators will be fitted with third-brush and thermostatic control.

Disco is centering on one model of generator and one of starting motors. Both motor and generator are built up of the same parts, differing only in the windings and armature laminations. They weigh

22 pounds each and allow for 6 volts. The generator is designed for either $\frac{1}{2}$ to 1 or 1 to 1 crankshaft speed. Special attention has been given to prevention of sparking of the commutator, and the factory tests show that the machines can be driven at over 7,500 r. p. m. without sparking.

Gray & Davis equipment has undergone little radical change during the past year. Both the motor and the generator are somewhat smaller and lighter than previous. Bendix drive is used to connect the motor to the flywheel. A special outfit of the double-deck type has been developed for Fords.

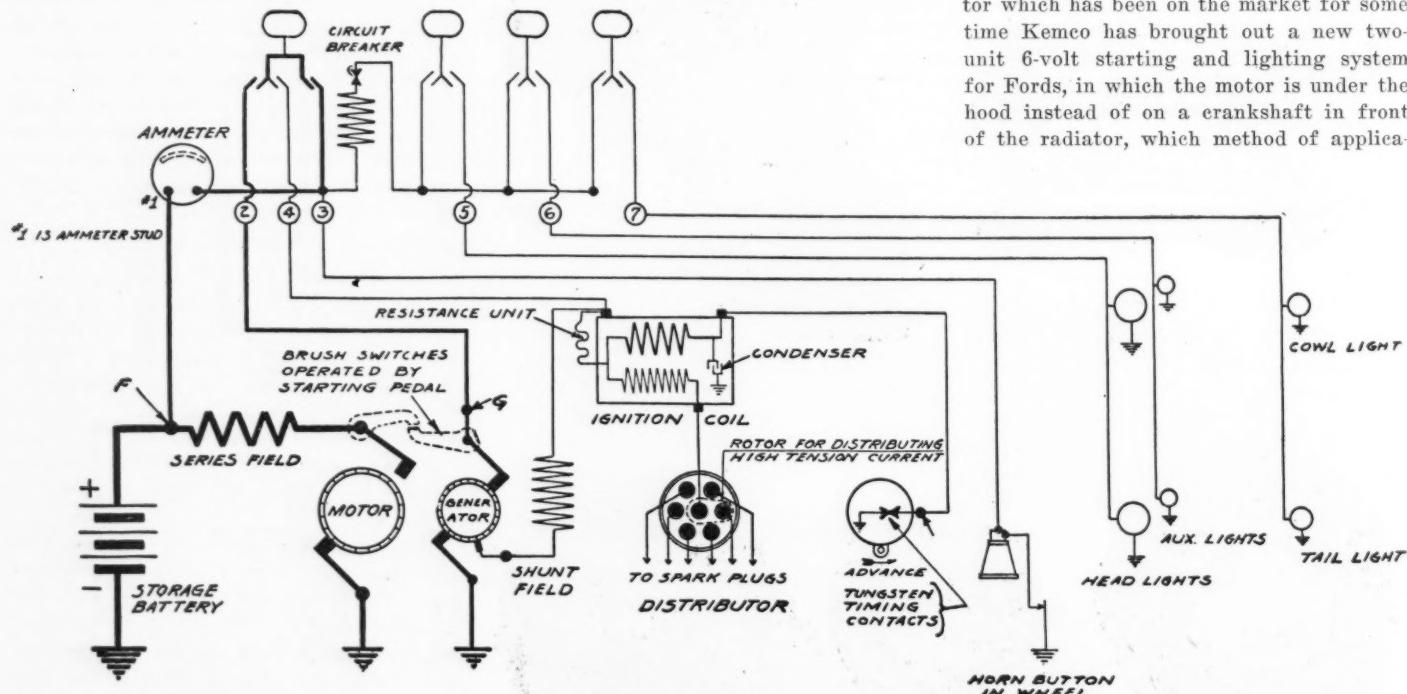
Simms-Huff starting and lighting system comprises a single-unit motor generator starting switch, regulator and cutout. The motor generator weighs only 30 pounds. Very little change, except in minor refinements has been made in the equipment during the past year.

The Genemotor, a motor-generator made by the General Electric Co. and designed particularly for application to Ford cars has, during the past year, been adapted for shaft drive from the Ford timing gears. Previous to early in the year it was driven by chain. It is marketed by A. J. Picard & Co.

Westinghouse has developed a Ford starting and lighting system. This is a single-unit driven by silent-chain from the crank-shaft.

The Splitdorf-Apeleo starting system for Fords, is a single-unit with silent chain drive from the crankshaft, operating at 12 volts for starting and 6 volts for lighting.

In addition to the fan type of generator which has been on the market for some time Kemeo has brought out a new two-unit 6-volt starting and lighting system for Fords, in which the motor is under the hood instead of on a crankshaft in front of the radiator, which method of applica-



DELCO SYSTEM ON BUICK

The output of these generators can be increased or decreased by changing the position of the regulating brush. Each time the position of the brush is changed it is necessary to sandpaper the brush so that it fits the commutator. Otherwise the charging rate will be very low, due to the poor contact of the brush. This should not be attempted by anyone except a competent mechanic, and the charging current should be carefully checked and in no case should the maximum current on this generator exceed 22 amperes. Also careful watch should be kept on any machine on which the charging rate has been increased to see that the commutator is not being overloaded.

tion has been employed in earlier Kemeo systems.

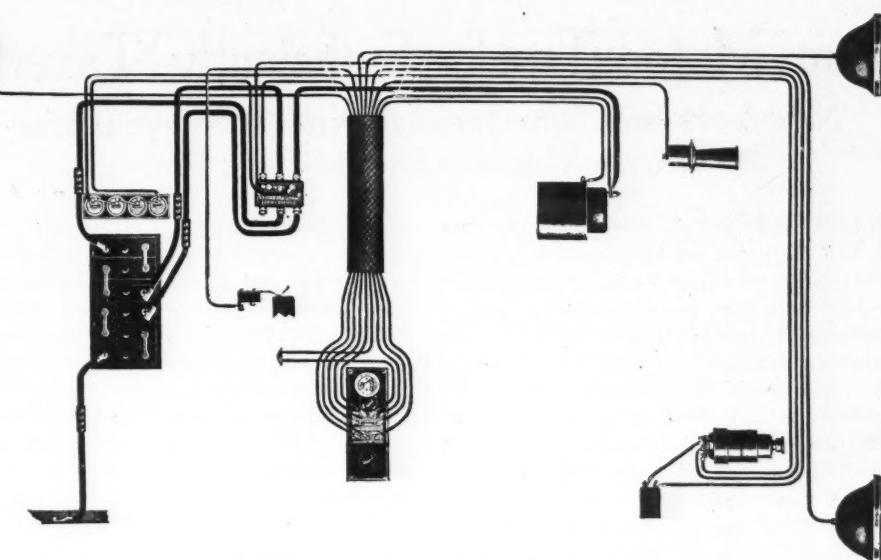
Another single-unit system designed especially for installation on the Ford, but also adaptable to other cars is the Henricks. This is driven by chain from the front end of the Ford and is designed for quick and easy application.

Another of the Ford starters is the Fisher, which likewise is a chain drive, single-unit instrument and drives direct from the crankshaft of the engine.

The Genolite, product of the Detroit Starter Co., is a generator designed to be applied to the Ford and furnish electric lights. It is reasonable in price and easy of application.

Automatic Trouble Shooter

To aid repairmen in testing out and locating troubles in electrical systems, the American Bureau of Engineering, Inc., has developed a very ingenious trouble-shooting outfit, designed to locate electrical troubles automatically. It consists of an especially constructed combined ammeter and voltmeter so graduated that the combined readings on the two indicate the paragraph and chart in a set of instruction books which give the trouble and the method of remedying it for any particular type of installation.



SIMMS-HUFF SYSTEM ON MAXWELL

As the Maxwell starting and lighting system is a grounded one, that is, the frame is used as the return circuit from starter, lights, horn, etc., care is necessary to prevent any part of the wire insulation from chafing through by contact with a sharp edge on the frame or other part. Should the ammeter indicate a heavy discharge or light fuses blow persistently or battery discharge over-night, examine wiring carefully for a short-circuit. All connections should be examined periodically and care taken that they are tight at all times. If ammeter does not indicate charge with engine running above 15 miles per hour, or when engine is speeded up, it is a sure indication of a broken wire or loose connection somewhere and should be attended to immediately. In a complete breakdown of the lighting system, circuit should immediately be tested for a break, or ground, as this wire carries the current for all lamps and horn. When individual lamps fail the trouble should be looked for in the wire between the dash panel and the unit which fails to work.

Hints on Care of Electrical Equipment

New owners are wont to regard the starting and lighting equipment of their cars with a great deal of awe and to feel that the electrical portion of the vehicle is beyond their understanding. Such is not the case and a little study of the connections and construction of the different units preferably under the tutelage of the service station, will mean many dollars' saving in repair bills.

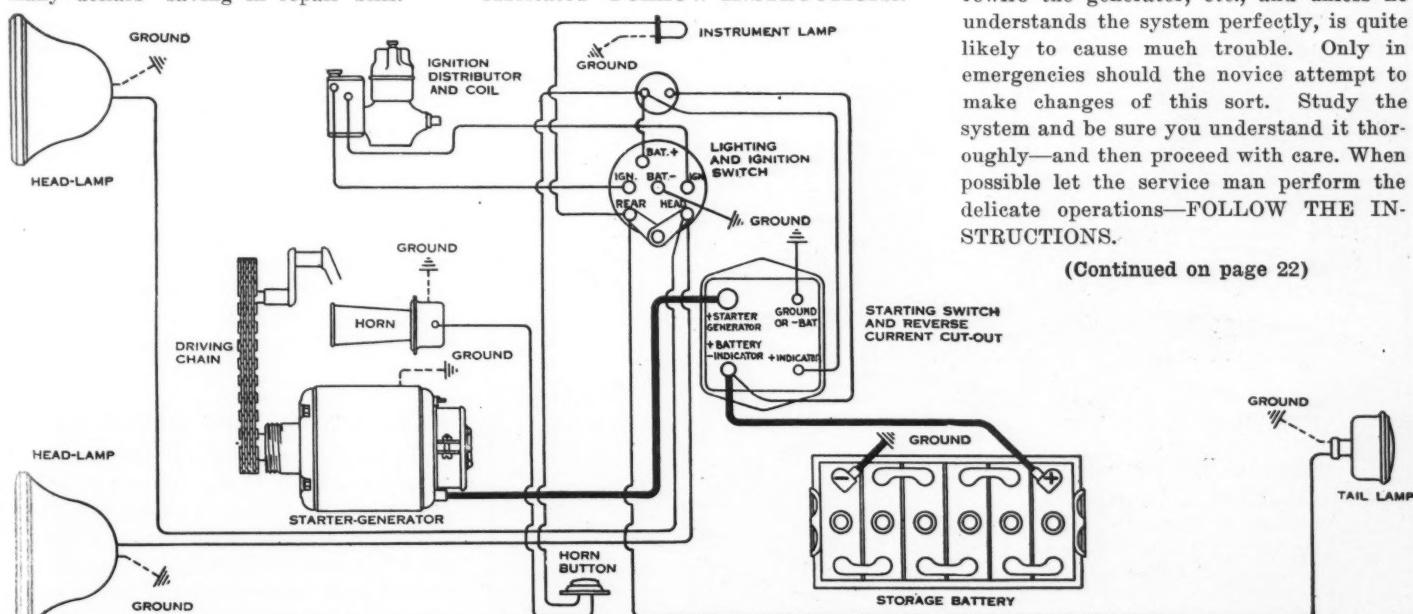
By far the most of the trouble and expense of repairs and replacements are due to one of three causes as follows:

1—*Under Lubrication* — No machine which has rapidly moving parts can operate successfully without proper lubrication. It is as necessary that you follow the instructions for oiling the motor and generator as it is to keep the engine well lubricated—FOLLOW INSTRUCTIONS.

2—*Over Lubrication*—Too much oil in electrical apparatus is as bad as too little. Oil on the commutator, etc., is bound to cause trouble—FOLLOW THE INSTRUCTIONS.

3—*Tampering by owner or others not acquainted with the system*—With all the best intentions in the world, the owner will endeavor to readjust his charging rate, rewire the generator, etc., and unless he understands the system perfectly, is quite likely to cause much trouble. Only in emergencies should the novice attempt to make changes of this sort. Study the system and be sure you understand it thoroughly—and then proceed with care. When possible let the service man perform the delicate operations—FOLLOW THE INSTRUCTIONS.

(Continued on page 22)



GROUNDED RETURN ON NEW SERIES DODGE BROS. CAR WITH NORTHEAST STARTING AND LIGHTING

This system is of the 12-volt single-unit type, having but one armature and one set of field windings, and operates both as a starter and as a generator. The armature shaft is supported at both ends by ball bearings packed in grease. The commutator-end bearing is further lubricated by the splash of oil from the timing-gear case; the commutator-end bearing is lubricated by oil introduced through the hole located in the center of the end cap on the starter-generator. A few drops of oil should be applied to this bearing every 2,000 miles.

Are Motor Trucks Sufficiently Taxed?

New York and New Jersey Owners Believe Horse-Drawn Vehicles Should Help Pay

NEW YORK, Nov. 27—Popular opinion in the great trucking centers comprising the states of New York and New Jersey seems to be that motor trucks are not at the present time taxed sufficiently for their wear and tear on the roads. This tendency has resulted in the formation of a commission in each state to determine a new schedule of fees to be based on the damage done to the roads by such vehicles.

The New York State commission, which is formed of the state engineer, the commissioner of public works and the highway engineer, held its first public hearing at Albany, November 21. That commission has not yet promulgated any new proposed schedule so that the first hearing before it resulted in the giving of suggestions. Among the most important of these was the fact that roads should be classed as governmental or state institutions, benefiting alike those who use them as well as those maintaining plants in the area

served, or those who own real estate in the same territory. It was pointed out that persons who call the fire engines when their houses are burning are not taxed especially for that purpose nor are they taxed when they happen to call in policemen to protect their property from theft or damage. The contention was made that roads play a most important part in the economic development of the state or nation at large and that their cost and maintenance should be borne therefore by the state or nation at large and not alone by those who run their vehicles over them.

It was also pointed out that any law passed basing fees upon the extent of use and wear and tear of roads should include all forms of vehicles including passenger cars and horse wagons as well as motor trucks.

The impossibility of living up to the word of the New York State law which specifically provides that the new schedule

of fees be based upon the extent of use and amount of wear and tear, was brought out by the fact that any such determination along scientific lines would require a tremendous amount of experimentation of various kinds of vehicles operating over various classes of roads at various times of the year.

It was pointed out that upon principle, all vehicles should be charged a certain fee to cover registration for identification only and that any additional tax to help pay for the cost of construction and maintenance of the road should be placed upon all vehicles and not alone on motor trucks.

KEROSENE CARBURETORS FOR FORDS

New York, Nov. 25—The use of kerosene as a motor car fuel will probably be considerably forwarded by the fact that the Ford company contemplates selling kerosene carbureters as optional equipment in this country and England. Beginning with January 1 delivery in England the Holley kerosene carbureter will be optional equipment with Fords; and beginning with February 1 it will be optional in U. S. A.

FISHER WILL DEFEND RIGHTS

Detroit, Nov. 24—The Fisher Body Corp. announces that it will defend its rights to manufacture convertible bodies. The company states that: "Coaches, equipped with removable or collapsible side window structures, were in common use long before the motor cars became general. Bodies of this type were mounted on European motor car chassis more than 10 years ago.

"For some time we have built bodies of this type following, in our general designs, the well-known and long-established ideas of English and French body builders as described and illustrated in technical journals and confirmed by our own engineers' personal observations abroad. An effort is being made to establish design patent rights to the commonly accepted type of convertible all-season motor car body. If successful this effort would impose on the buyer of every motor car equipped with such a body, we believe, an unjust tax. We deny the right of any organization or individual to levy such a tax and we here-with announce our determination to resist with every means at our command any action which may be brought against us to this end."

DEALERS PROTEST LICENSE LAW

Hartford, Conn., Nov. 25—Dealers have not taken kindly to the existing state law insofar as registration of cars is concerned. The dealers claim that because a license for any car is much cheaper after April 1 than it is at the beginning of the calendar year many prospects defer purchase of cars until spring and then demand a fairly prompt delivery. It is the contention of the men who sell the cars that a man should pay as much for a license one time

The Luxury-Loving American Public



—From Decatur, Ill., Herald

as at another unless the purchaser has not owned a car the year before. They also contend that if a man had to pay as much one month as three months earlier he would buy his car then and get that 3 months' additional service out of it and at the same time the dealer would be doing business at the time he wants most to do it, in the winter when there is snow on the ground. Of course, it will be readily granted that the number of cars used in cold weather is yearly becoming greater because the self-starters make winter driving a more simple proposition than in the days of hand cranking. It has been suggested that the situation be put squarely before the state legislature when it convenes in January, but whether or not this action will be taken remains to be seen.

STOUT PACKARD AVIATION MANAGER

Detroit, Mich., Nov. 27—December 1 William B. Stout, general sales and advertising manager for the Scripps Booth Co., becomes manager of the Aircraft division of the Packard Motor Car Co.

W. I. Brown, present assistant sales manager of the Scripps-Booth Co., has been made general manager.

DEPARTMENT STORE SELLS CARS

New Haven, Conn., Nov. 25—For the first time in the history of New England, if not in the country, a department store has branched out and taken on an agency for a motor car. The firm of Shartenberg & Robinson has taken on the agency for the Jordan car, and a model has been placed on exhibition on the main floor of the store. When other models arrive they will be given a place in the big store, and now a new phrase can be coined for such establishments: "Everything from a safety pin to a six-cylinder motor car." The plan will be watched with much interest. As this is the home of Yale University there is a possibility of the department store making many Jordan sales. It is a reminder of the days when Henry Ford was fighting the Selden patent and the A. L. A. M., and he said that, to break the combination if they forced him too hard, he would build 100,000 cars and sell them at the then unheard of low price of \$500 each in Wanamaker's and other department stores.

RUSSELL SUCCEEDS PETTIT AT CASE

Racine, Wis., Nov. 25—E. E. Russell, for 27 years associated with the J. I. Case T. M. Co., Racine, Wis., today was promoted to the position of general purchasing agent of the company, effective January 1, to fill the vacancy which will occur at that time by reason of the resignation of Frederick R. Pettit, who becomes vice-president of the J. I. Case Plow Works, Racine. Mr. Russell has worked his way from the lowest position in the Case T. M. works and for 12 years acted as manager of the foreign sales department.

Twelve-Cylinder Sermon Big Attraction

Illinois Divine Adopts New Plan to Draw Audience—Reporter Sees Funny Side

CARNEGIE, Ill., Nov. 25—Rev. J. E. Steson, pastor of the Methodist church here, packed the edifice to the doors on November 19, when he announced a motor car sermon. Car owners from points as far distant as 30 miles, came to hear what he had to say.

Many persons in the congregation had not been in the habit of attending church and the sermon, from this standpoint alone, was a great success.

The grounds surrounding the edifice were parked with numerous cars and the sight was sufficient to attract the wonderment of the entire city. Pastor Steson, whose wit inspired the scheme of advertising for an audience, rose to the occasion handsomely and delivered a twelve-cylinder sermon without a puncture or a blowout. He didn't say which car developed religious tendencies most rapidly, or vice versa; he did not announce the Paige upon which his text was written; he failed to Ford the Jordan, nor recount the incidents in the life of the young man who demanded Velie of his dad, nor how an Egyptian butler Studebaker off and won the favor of his lord; but he did throw the headlight on the backyard of the garage where many an old boat has gone to the scrap heap. He urged his hearers to be progressive, discard all out of date machinery, actually and figuratively; send religious notions that have served their time to the junk pile; use modern methods and materials in everything we do, and, then, like Elijah, we'll be ready when our car heads toward Zion.

Rev. Steson announced that the meeting

was such a success that it would be an annual event hereafter.

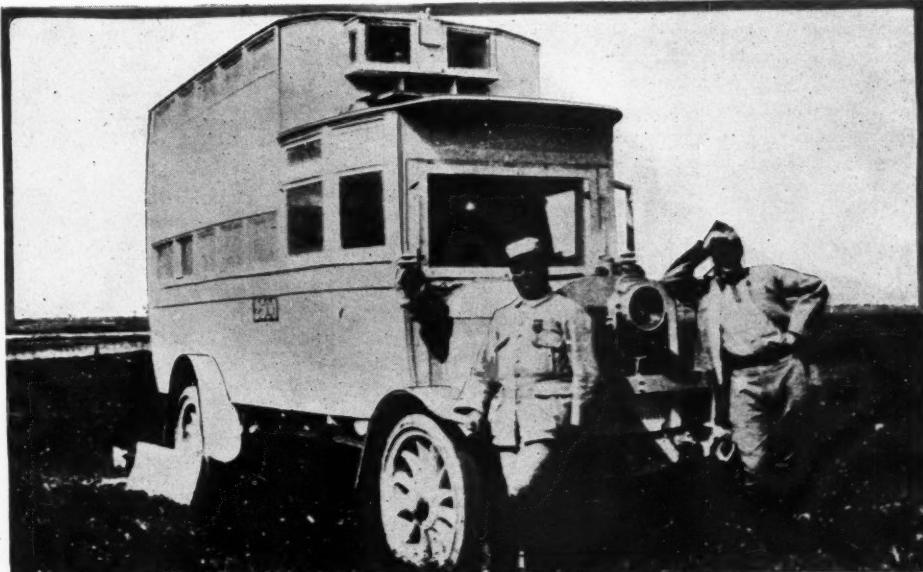
TO INFORCE HEADLIGHT ORDINANCE

St. Louis, Mo., Nov. 27—E. S. Marvin, chairman of the legislative committee of the Motor Accessory Trade Association, told the members at the monthly meeting last Tuesday night that he was taking up with the police department the question of enforcement of the headlight ordinance. The requirements are that the chief ray of light shall not be more than 3 feet above ground 75 feet in front of the machine. Little heed is being paid to the ordinance at present.

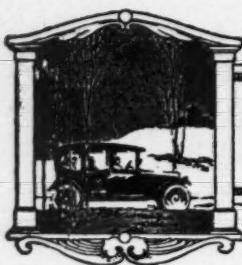
Mr. Marvin said that he and the police had gone over the failure to get the law enforced and a campaign of education among those concerned had been begun. Also that it was the opinion that motorists had been sufficiently educated so that they would not all do away entirely with lights when action was taken, as they did before. The result of the previous attempt was an epidemic of accidents due to unlighted cars, the drivers fearing arrest if their lights were at all bright. Dealers were advised to lay in a stock of proper lights and lenses.

FORBID DOWNTOWN PARKING

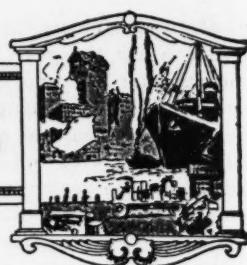
Detroit, Nov. 25—The police department has issued orders forbidding motorists to park their cars within an approximate half-mile circle about the business section of the city.



Hotel car used extensively by French officers to enable them to visit all parts of the war front. The car has a bedroom, kitchen and map room



EDITORIAL PERSPECTIVES



The Winter Load

THE electric starting and lighting system in use today, while marvels of perfection for the short time in which they have been developed, are nevertheless not as fool-proof in cold weather as the differential, the gearbox or the clutch. Cold weather cuts down the efficiency of the battery. Cold weather thickens the motor oil making it harder to start a cold motor. Cold weather so influences the gasoline that with a cold motor the flow of gasoline out of the carburetor nozzle is much slower when starting a cold motor than it is 20 minutes later when the motor is warmed up. In winter the majority of car owners drive in the city where streets are congested, where driving is slow, and where there are many stops. In the winter electric lights are burned much more than in summer and on top of this you do not get a real opportunity to get car speed enough to do as much

charging as in summer time. In the summer time you are off on long road trips at good speeds. You have long days and short nights. All this is exactly reversed in the winter. Keep all of these reversals of condition in mind during the winter months when using your car. Keep these facts in mind when your motor will not start on a cold morning and you foolishly keep on using the starter which turns your crankshaft over but the gasoline is not there to do the rest. You may have to do some priming, you may have to have additional carburetor equipment, and you will have to use good judgment with all of them. It is foolish not to give your electrical equipment good winter attention, and then expect it to give the last word in service. It must receive attention, it must be given care, and it must be handled rationally.

Taxing Motor Trucks

THERE is promise that motor truck users will have to wage each year or so the same battles to prevent truck registrations being raised that passenger car owners and dealers have had on their hands for several years. Already some of those states having many trucks registered are laying plans to make motor trucks pay higher fines. The assumption is that motor trucks wear out the roads and so must pay higher fees. It is extraordinary that in these same states there is no movement to make horse-drawn vehicles pay higher fees. According to arguments the motor truck is the only thing that wears out roads and so owners of these vehicles must pay the entire revenue for road destruction.

* * *

NEEDLESS to say motor truck users are going to oppose this program of annually raising the truck tax. New England has had to fight the annual raise for several years, and each succeeding year the problem comes up as surely as there is a rising and setting of the sun. It is looked for. Truck interests expect to have to make the annual fight. What is happening in New England, New York state and New Jersey is sooner or later going to fall to the lot of all the other forty-five states. The truck registration matter is going to come before them. Truck registration offers a good chance for additional revenue, particularly when there are enough trucks to make it worth while.

* * *

MOTOR car owners and truck owners will sooner or later have to start a fight-to-the-finish argument on this question of revenue from registration. It is generally conceded as right that there should be registration for the cost of registration but not as a source of revenue. What is right for passenger cars in this respect is also right for motor trucks. As a motorist you may not live in New England, in New York state or in New Jersey but the truck registration matters that are up for consideration in these states all have an interest for you irrespective of the state in which you live. You cannot get away from it, because what these states are contending with today will be your problems of tomorrow. The time is coming when the question will have to be settled whether you can register cars and trucks for revenue or not. Be ready to take your side when it arrives.

Road Bodies and Traffic

ROAD associations such as the Yellowstone trail, Old Trails highway, Lincoln highway, should take up with every city and town on their routes the problems of having standard traffic signals, and general traffic rules in every city and town lying along their respective routes. It is when traveling along such routes that the motorists are confronted with the chaos of traffic control due to lack of standard signals. In many relatively small towns it is becoming customary to find a traffic officer at the main center of traffic. These so-called traffic officers are generally each a law unto himself. He stops a car when he feels so inclined and lets another pass if it is his humor. There is often not a semblance of order in the methods used by them in controlling traffic. They are often as great incompetents as can be found. The fault is not theirs. They do not even know the first rudiments of efficient traffic control.

* * *

LET each road association distribute to every town and city along its route a printed code of traffic regulations. These should be very simple. In all not more than ten or a dozen regulations at most are needed. Distributing such regulations to each city would insure a start on standardized traffic. It would mean that traffic officers or local police would at least have the rudiments of how traffic should be handled.

* * *

THESE road associations can go further. They could have such traffic control regulations printed in the local papers. Thus would the message of standardized traffic control reach every motorist. It is essential that the motorists get such, just as it is important that the policemen and traffic officers get such. If all motorists understood standard traffic rules then all traffic policemen would have to because otherwise their lives would be so miserable that they would resign their jobs.

* * *

THERE is no reason why the national government should not take up this question of standardized traffic control. It is important to have a commission which might handle such matters. Such a commission could meet twice a year and in that way perform a most valuable service to every person using the highways and streets.

Retrospect-Then Be Thankful

By William K. Gibbs

The tallow dip of time we call a year
Marks off another epoch in our life;
We reminisce: Before us should appear,
The best the cycle's offered sans all strife.

Thanksgiving Day again has been proclaimed;
Motordom owes thanks—thanks freely given—
For old 'sixteen high honors has attained;
Many things you gained for which you'd striven.

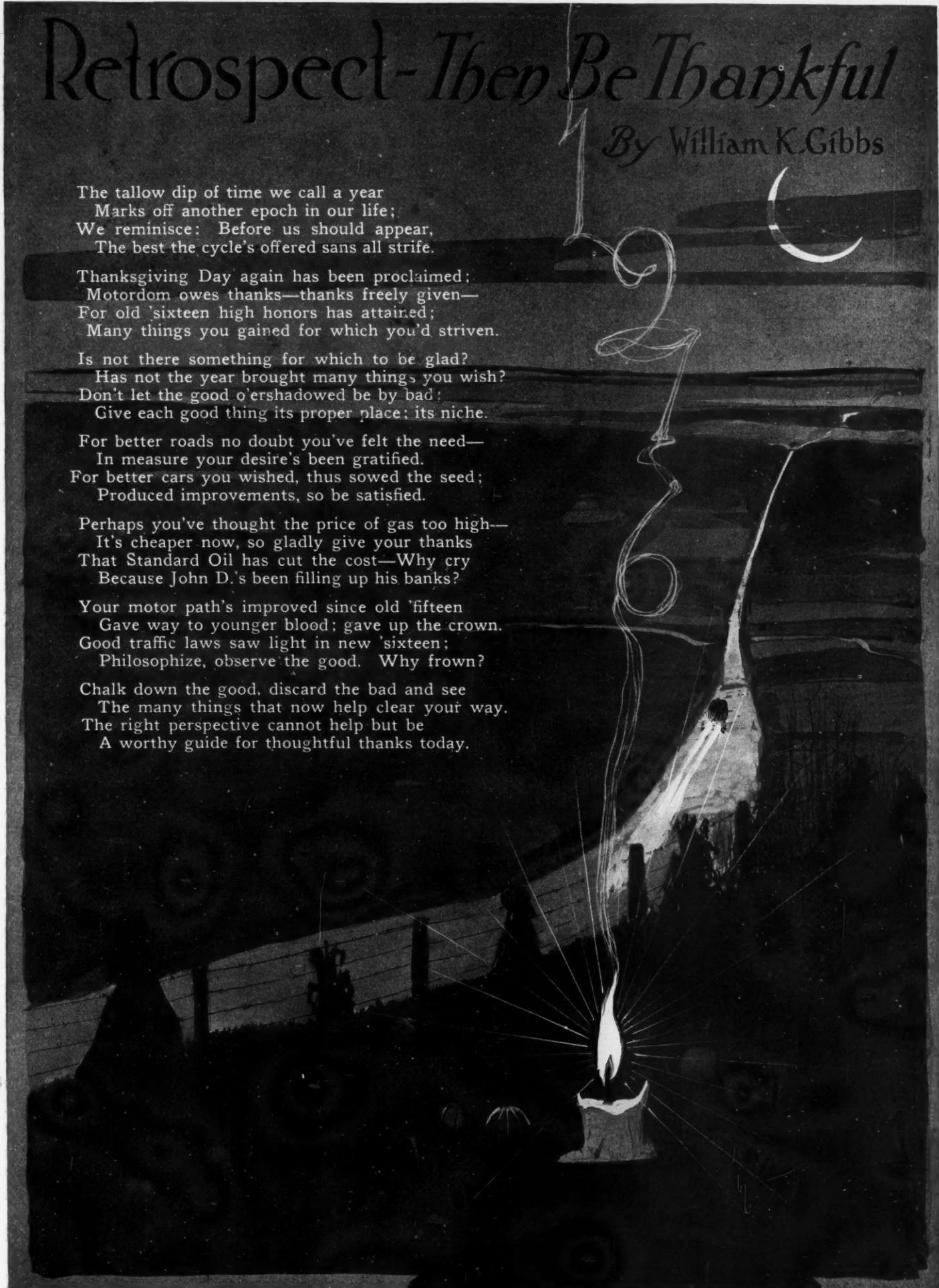
Is not there something for which to be glad?
Has not the year brought many things you wish?
Don't let the good o'ershadowed be by bad;
Give each good thing its proper place; its niche.

For better roads no doubt you've felt the need—
In measure your desire's been gratified.
For better cars you wished, thus sowed the seed;
Produced improvements, so be satisfied.

Perhaps you've thought the price of gas too high—
It's cheaper now, so gladly give your thanks
That Standard Oil has cut the cost—Why cry
Because John D.'s been filling up his banks?

Your motor path's improved since old 'fifteen
Gave way to younger blood; gave up the crown.
Good traffic laws saw light in new 'sixteen;
Philosophize, observe the good. Why frown?

Chalk down the good, discard the bad and see
The many things that now help clear your way.
The right perspective cannot help but be
A worthy guide for thoughtful thanks today.



Resta and Aitken Out of Ascot



How the movie-camera man works. View of part of the grandstand at the 1916 Grand Prize

LOS ANGELES, Cal., Nov. 25—The last of the American Automobile Association championship events will be run at Ascot Park Thanksgiving Day without either of the two leaders, Resta or Aitken, participating. These two admitted they were afraid to drive on the paved course that Burman declared was the best mile track in the world. Aitken quit cold and Resta remains here to become champion by default. There are 700 points involved in the championship race and a victory for Aitken, if Resta failed to place, would have brought him the coveted honor.

There is no gainsaying the fact that Aitken and his management, the Indianapolis speedway, soured when Chairman Kennerdell, of the A. A. A. contest board, ruled Aitken could not be credited with any points for winning the Grand Prize race when driving relief for Wilcox. There was no attempt made to deny that the switch in drivers was made to give Aitken a chance at the 1,000 points allotted to first place, after his own car had failed in the first lap.

Southern California race fans have become embittered toward Resta and Aitken for their refusal to drive at Ascot. Newspapers speak of them as "prima donnas." Rickenbacher, Pullen and Ruckstell are the popular drivers. Ascot Speedway As-

Attitude of Drivers and Management Sours California Racing Spirit—Golden State May Ban Road Meets

sociation paid the A. A. A. for its sanction and to have the Thanksgiving Day race listed as a championship event. The A. A. A. is regarded with divided feeling in these parts as the result of the break a year ago. That Chairman Kennerdell did not insist on Aitken and Resta driving is the cause for criticism on the part of Ascot adherents.

The Ascot track requires the best a driver has every minute of the race. There is a thrill a minute for the crowd. The cars are in plain view all the time and, although speed is much slower than on the eastern board tracks, spectators are kept keyed to a high state of excitement that brings them to their feet cheering all the time.

A record-breaking attendance is predicted for the coming meet, which will be 150 miles for a purse of \$5,000.

NO MORE CAL. ROAD RACES

Los Angeles, Cal., Nov. 25—Indications are that there will be no more road racing of any kind in California. Public sentiment has been aroused and as long as the feeling now prevalent exists the ban will be on. A meeting of the state highway commission and representatives of county and municipal authorities was held a few days ago in Sacramento and recommendation was made that at the next session of the state legislature a law be enacted to prohibit racing. It will be made to apply to horses, horse and vehicle, and all forms of motor vehicles.

The accident that occurred during the running of the Grand Prize on the Santa Monica course had its effect. Mayor Berkley, of the beach city, says there never will be another race there while he is mayor. Other citizens of influence do not put a time limit on their opposition. Despite the fact every purchaser of a ticket to the Vanderbilt and Grand Prize races waived right to claim damages in case of accident, it is evident a number of suits will be instituted naming Santa Monica



William Weightman 3rd, a Virginia millionaire, drove his own Duesenberg to third place in the 1916 Vanderbilt. It is the sport, not the purse, that tempts this latest racing surprise

as defendant, although no names have been made public as yet.

A coroner's jury that investigated the cause of the four deaths that resulted when a racing car driver lost control of his machine and it hurtled into a thin row of spectators returned a verdict in which it was stated decedents came to death "as the result of a motor car race sanctioned by the city of Santa Monica, and we find that the course was not properly protected."

Just what instigated the allegation of improper protection of the course is known only to the jury. There was no way to anticipate the probability of an accident at this point. The car left the road on the inside instead of the outside of the curve. Guards had kept the people well back from the outer bend. A row of trees cut off the view on the inside and few spectators were on the inside of the course.

TACOMA RACE DATE CHANGED

Tacoma, Wash., Nov. 25—David Outealt, vice-president of the Tacoma Speedway Association, has had the date of Tacoma's annual race meet changed to July 28, 1917, instead of July 4. Plans have already been outlined for the coming meet, which promises to be one of the best ever held on the Northwest course.

TWO KILLED AT UNIONTOWN

Uniontown, Pa., Nov. 28—Special telegram—M. Heists, Sharpsburg, Pa., and F. E. Bush, Pittsburgh, Pa., were killed yesterday while traveling 60 miles an hour on the Uniontown speedway. A broken front axle was responsible for the accident.

MAXWELL IN NON-MOTOR-STOP RUN

Boston, Mass., Nov. 25—A Maxwell touring car started on a non-stop run last Wednesday that is to continue indefinitely throughout Greater Boston. The machine is being handled by three crews who work



Lewis Jackson, killed in the 1916 Vanderbilt



To this stop may be attributed the cause of the death of Louis Jackson, Marmon driver. Two laps were driven after repairing the broken wheel, when the fatal accident came



The mangled wreckage of the Marmon of Jackson, which was the direct cause of four deaths and three serious injuries. The four wheels were stripped from the car 30 feet before it stopped

in relays of 8 hr. each. They drive anywhere they want to go in the district. At noon each day the car is driven to the rooms of the Bay State A. A. at the Hotel Lenox where the seals are inspected by an officer of the organization. No attempt is being made to run up a long mileage, for the Maxwell holds the world's record of 22,000 miles on a non-stop run made on the Pacific coast. The run here was started on the anniversary of the starting of the one on the Pacific coast. It is the third time a Maxwell has started a non-stop run in Boston, the first one covering 3,000 miles and the second one 10,000 miles, made some years ago. When the car checked in at noon today the figures for the first 72 hours showed 1,005 miles, which gave an average just under 14 miles an hour since the start.

TO SETTLE LINCOLN ROUTE TANGLE

Chicago, Nov. 25—A special meeting of the national board of directors of the Lincoln Highway Association, has been called for next week here to iron out the differ-

ences which now exist regarding the dual route between Frankfort and Chicago Heights, each claiming to be the official line through northern Illinois. J. W. Corkings, chief counsel, recommended that the south road out of Frankfort be accepted, and Will county members indorsed this stand. Chicago Heights interests, however, favor the north route, asserting that there is official backing for their contention.

PILOTS WILL MAKE RACERS

Detroit, Nov. 27—De Palma, Rickenbacher and Chevrolet are going to manufacture racing cars for their own use in the 1917 speedway campaign. Rickenbacher, who is in Los Angeles for the 150-mile Ascot race, will come to Detroit to build a team of racing cars to be owned by W. Weightman III, Kenova, W. Va. Chevrolet will work over the three Frontenac cars built jointly by himself and Joseph Boyer, Jr., this year. De Palma will devote himself to the De Palma Mfg. Co., which is to build special speedsters for those who want cars of that type.

Steal Cars to Order

Testimony in Trial Brings Out Some Startling Machinations of Vehicle Thieves

Made Proposition to Deliver Car of Any Make in Given Time

CHICAGO, Nov. 25—The inside workings of Chicago's motor car thief trust was put under the spotlight this week when the heads of the organization were heard in the criminal court. Speaking coolly and deliberately from the witness stand, and with an occasional exchange of smiles with the woman against whom he testified, Walter Relihan, confessed motor car thief and right-hand man of the trust, told of numerous cases of stealing and disposal of machines, implicating Mrs. Elvina Stiles as the brains of the organization and as the one who acted as fence for the gang.

Relihan named Maj. William R. Stiles of the postal service, husband of Mrs. Stiles, as having had knowledge of the operations of his wife, and implicated a William Corneau, who he said was a lawyer, as a friend of Mrs. Stiles, who was to get a split on the proceeds of one of the stolen cars. The news, made public during the morning of the trial, that Relihan had turned state's evidence, caused a sensation in court.

Relihan told of eight instances of cars stolen by the trust alleging that it was Mrs. Stiles' part to find and contract for their sale. He and another man, he said, made arrangements with one or more members of the gang who actually stole cars to steal some car of a make desired by a so-called customer, or to deliver a car already stolen to the purchaser. The cars, he testified, were altered in appearance after being stolen.

Car Thief Gets 5 Years

Milwaukee, Wis., Nov. 25—Five years in the state prison is the penalty meted out to Harry Dunn, who pleaded guilty in the municipal court at Milwaukee to the charge of stealing thirty-six motor cars. It is the heaviest sentence yet imposed for the crime, but the offense at the same time is by far the gravest ever noted. Dunn and an accomplice are said to have made a business of stealing cars, changing the identification marks, appearance, etc., and then disposing of them.

Pathfinder Offers Theft Reward

Indianapolis, Ind., Nov. 27—W. F. Stalnaker, vice-president and director of sales of the Pathfinder Co., is the author of a plan that in the opinion of motor car manufacturers and dealers will eliminate a great part of the vast motor car stealing industry of the entire country. It will, of course, take coöperation of all the motor car industry to put the plan into effect,

but it is so simple that this seems inevitable. It started election night in Indianapolis, when Mr. Stalnaker parked his car in front of a theater and found the car stolen in an hour.

"In order to assist in breaking up the stealing of cars in this vicinity this company will pay a reward of \$500 for information that will lead to the arrest and conviction of any person or persons for stealing any Pathfinder car in Marion county at any time during the next 6 months."

MAY STOP LOOP PARKING

Chicago, Nov. 27—An aldermanic committee has started a movement to clear up traffic congestion in the downtown district known as "the loop." The committee recommends that parking of cars along the curb be prohibited in streets where surface cars run, between the hours of 7 and 10 a. m. and 4 to 7 p. m., after January 1, and after July 1, 1917, that the parking in the districts be prohibited from 7 a. m. to 7 p. m. There is likely to be considerable objection on the part of people who conduct their business by motor in the loop.

Price Increases of Week

SYRACUSE, N. Y., Nov. 25—The Chase Motor Truck Co. has increased the price of the model A, 1-ton truck, and the model C, 1½-ton truck \$75 to take effect December 1. This will list the model A at \$1,725 and the model C at \$2,025.

RIKER TRUCK PRICES UP

Bridgeport, Conn., Nov. 24—On December 1 the prices of Riker trucks, the commercial product of the Locomobile Co., of America, will be increased. The 3-ton truck will sell for \$3,600, an increase of \$100, and the 4-ton will sell for \$3,750, an increase of \$100. This is to maintain the standard of materials and workmanship in view of the increasing cost of manufacture.

VELIE PRICES UP

Moline, Ill., Nov. 27—The Velie Motors Corp., this city, will advance its prices \$50 on the open bodies delivered on and after January 1, 1917. Cars ordered and delivered prior to that date will be at the present prices, which are as follows: Model 28, \$1,085; with detachable sedan top, \$1,285; four-passenger roadster, \$1,085; two-passenger roadster, \$1,065; model 27, \$1,550. The closed models are excepted from the advance.

PREMIER PRICES INCREASED

Indianapolis, Ind., Nov. 28—Special telegram—Changes have been made in Premier prices, the seven-passenger touring car and four-passenger roadster now listing at \$1,895, the limousine and town car at \$3,150 and the sedan at \$2,900.

Stopping at Crossings

Question of Halting Car Before Driving Over Tracks Given Consideration

Several Bodies at Washington Discuss Advisability of Measure

WASHINGTON, D. C., Nov. 25—When shall an operator of a motor vehicle be compelled to come to a full stop at a railroad crossing at grade, was the question which occupied the most consideration in the recent conference at Washington, participated in by representatives of the National Association of Railway Commissioners, the American Automobile Association, and the American Railway Association.

The meeting had as its purpose the country-wide adoption of a uniform system of signals and other precautionary measures, it being set forth that "one sign should signify the same thing everywhere, installed so as to be in plain view of the driver of a vehicle and so that it could be plainly read at night by motor car headlights."

Unanimity existed as to the type of first warning sign to be erected by city, town, or county, and also that it should be located not less than 300 feet from a crossing, but the full stop proposition came in for much discussion. Osborne I. Yellott, chairman of the A. A. A. legislative board, thus presents the contention of the motorists:

Minimizing Accidents Necessary

"It was realized by the A. A. A. representatives, who included President H. M. Rowe, that while the number of accidents at grade crossings was almost infinitesimally small in comparison with the number of such crossings made safely by motorists during the course of a year, nevertheless some steps should be taken to minimize accidents to the smallest possible degree. Two propositions were suggested by the spokesmen of the railroads; the first providing that within 100 ft. of the crossing the motor vehicles should not proceed at a rate of speed greater than 10 miles per hour; and the second that the motor vehicle should be brought to a full stop not less than 10 ft. from the nearest rail of the crossing."

"The first suggestion was objected to on the ground that it was unreasonable and would tend to give rise to the maintenance of obnoxious speed traps at such crossings, with resulting inconvenience and injustice to many motorists who were, in fact, exercising all proper caution in approaching the crossings in question. The second was objected to mainly on the ground that it was unreasonable to require motorists to stop at all crossings, since in many instances the tracks in either direction are visible for such distances as to

make stopping entirely unnecessary. It was finally agreed that motorists should be required to reduce speed and proceed cautiously at all crossings, and that the public service commissions, or railroad commissions, of the several states should have the power to determine the crossings at which it was reasonably necessary that stops be made; such full stop crossings to be designated by appropriate signs, and the failure of a motorist to stop at such to be *prima facie* evidence that he had not proceeded cautiously in making such crossing.

"In making this latter concession the representatives of the motorists realized that there are some grade crossings at which ordinary prudence requires a full stop, and that inasmuch as conditions vary so much at this class of crossing, it would be better to leave the determination of such to responsible bodies such as public service commissions."

While the complete proposed bill tentatively agreed upon by the participants in the three-cornered conference was not adopted by the National Association of Railway Commissioners in their subsequent general gathering, approval was given to the seven propositions put forward in resolutions adopted at Chicago last June by the special grade crossings committee of the American Railway Association, and a similar committee from the railway commissioners.

These proposals set forth the need of uniformity and also describe the kind of sign and its location. In approving the report of its committee on grade crossings and trespassing on railroads the railway commissioners recommended to the several state commissions the submission to legislatures of whatever bills may be necessary "to put said committee's recommendations into effect, to the end that, pending the separation of grades, which we regard as the final objective, uniform and effective protection may be provided at grade crossings in the several states."

Speaking for the motorists' organization, Chairman Yellott infers that the full-stop proposal will be combated, except under the plan which he sets forth.

QUEBEC TO BOOST LICENSE FEE

Quebec, Can., Nov. 25—The Quebec government has plans for further taxation and one of the industries on which the additional taxes are to fall is the motor vehicle industry. Hon. Walter Mitchell, provincial treasurer, has introduced legislation to amend the motor vehicle law so as to increase the revenue derived from this traffic, and also further to safeguard the public from the dangers of motor traffic. It had been anticipated for some time that the motor industry would suffer further taxation or an increase of licenses owing to the fact that further amounts are needed for good roads in the Province of Quebec.

Quantity Basis Electrics

Anderson Making Broughams on Big Scale — Several Changes Noted

New Model \$500 Lower in Price Because of Standardized Design

DETROIT, Nov. 27—An entirely new Detroit electric has been brought out by the Anderson Electric Car Co., of this city. The new model, known as 68, represents the initiation of a production policy for Detroit electrics. As a result of a greater increased production schedule the model 68 will sell for \$500 less than its predecessor. This cut from \$2,275 to \$1,775 in the face of greater increased cost of materials represents the saving due to the installation of a large amount of labor-saving machinery and the adoption of a standardized chassis in which the number of options has been minimized so far as color and equipment is concerned. For example, in upholstery there are three designs to choose from, while in painting there is one standard, whereas last year there was an unlimited field for either upholstery or painting. No sacrifice in material or workmanship has been made in any part in quoting the new figure.

The body is a brougham having a passenger capacity of four and is built on a chassis of 100-in. wheelbase with 56-in. tread. It has the standard Anderson motor with forty-two cells, a thirteen-plate battery giving a speed of 6 to 25 miles per hour and a mileage of 75 to 100 on a battery charge.

Officials of the Anderson Electric Car Co. estimate at the present rate of increase the company's current year's business in electric passenger cars will exceed last year's by at least 100 per cent. The raw material for building the coming year's product has either been delivered

Changes in Industry

CHICAGO, Nov. 27—Edward F. Swift, vice-president of Swift & Co., Chicago, has been elected a director of the Willys-Overland Co., Toledo.

Mr. Swift has been for several years a personal friend of Mr. Willys, and is a large holder of Willys-Overland stock. Mr. Swift is well-known as one of the heads of a great institution doing a business of over \$600,000,000 per year.

DURANT RE-ELECTED G. M. HEAD

Detroit, Nov. 27—W. C. Durant has been re-elected president of the General Motors Co. This action was taken at a recent meeting when Pierre S. Du Pont was made chairman of the board of directors. Mr. Durant reported that the company's business is averaging \$2,250,000 a month.

to the plant or is under contract for specified delivery dates. The production of Detroit electric cars increased in 1916 over 1915 by 141 per cent, while the labor increase was not 100 per cent. This ratio is due to the introduction of a large amount of new machinery.

The first 4 months of this fiscal year show an increase of 79 per cent over last year. The company has just erected in Detroit a new four-story service building of brick which has a capacity of 400 cars with repair and charging facilities and a large show and sales room.

MITCHELL DECLARES DIVIDEND

Racine, Wis., Nov. 27—The Mitchell Motors Co., Inc., is right now at the height of its production history. Many factory additions are being made, which will more than double the capacity for the coming year. The company has just declared a dividend of \$1.50 a share.

BIMEL SALES INCREASE 227 PER CENT

Chicago, Nov. 25—In the November 16 issue of Motor Age, in connection with a statement of the sales increase of the Bimel Spoke and Auto Wheel Co., Portland, Ind., the percentage of increase was given as 22 per cent instead of 227 per cent.

S. O. TO BUILD AT LOUISVILLE

Louisville, Ky., Nov. 25—The Standard Oil Co. of Kentucky will build a refining plant in Louisville as soon as possible at the cost of about \$1,000,000. It is understood that the refining plant will turn out a variety of oils including illuminating, fuel and oils for road purposes. No information is given as to the location of the plant. This will be announced later. The Standard Oil Co. owns a tract of ground on the river bank near the state fair grounds.

NEW KELLY-SPRINGFIELD PLANT

New York, Nov. 24—Engineers will start work in the near future on plans for the new plant of the Kelly-Springfield Tire Co., at Cumberland, Md. The plant will cover about 75 acres. Ground will be broken early next spring. The completion of the plant will mean a minimum increase of 400 per cent in the present capacity of that company.

CAR PLANT FOR ENID

Enid, Okla., Nov. 25—The Geronimo Motor Car Co. has been organized to manufacture motor cars in this city in a three-story plant. It will produce a six-cylinder car with a Continental motor. The directorate consists of mostly local bankers, and the capital is \$500,000. Shands & Funnel are the fiscal agents for the company. W. C. Allen, is president; G. E. Darland, secretary and treasurer, and Walter Krouse, vice-president. F. B. Buzzard is a director.

Orient Wants American Cars

Singapore Manager of New York Agency Branch Describes Conditions That Influence Motor Trade in East

DETROIT, Nov. 24—Imagine a country where the natives refuse to buy a motor car with a left hand drive, where they insist upon having clincher tires, where gasoline costs 45 cents a gallon, where electrical equipment is frequently torn out because of native prejudice and where chauffeurs can be hired for \$12 gold a month. Those are a few of the interesting details brought from Singapore by G. M. Malcolm, general manager of the Oriental branch of Speyer, Cole & Co., New York, who is in Detroit on business. Speyer, Cole & Co. control the Asiatic territory for Hupmobile, Scripps-Booth, Harroun, Denby and Ramer products and they also conduct a banking business with motor car dealers.

Few two-passenger cars are used in the far East, according to Mr. Malcolm, as the exceedingly low wages paid to chauffeurs allow every car owner to hire his own driver. This low salary produces a curious effect on taxi rates. Though gasoline costs 40 to 45 cents a gallon and tires and parts are almost double the prices in the United States, the low wages received by the drivers allow the taxi owner to charge a rate of \$1.68 an hour for a first-class machine.

Freight Rates Increase Car Prices

High freight rates have caused the prices of many motor cars to become more than twice their American selling prices. Since the beginning of the war the ocean freighters charge \$30 a ton of 40 cubic feet for motor cars, which were \$10 a ton before the war. This rate means that a 7-ton Ford touring car costs \$210 for ocean freight alone, and as a result, when the dealer adds the railroad freight in the United States and Asia, he is forced to charge \$1,750 native money or \$890 gold for the same car that can be purchased here at \$360. The cars predominating through Japan, India, China, Burma and Java are the Ford, Overland, Buick, Studebaker, Hupmobile and Hudson, with the Ford taking the lead in numbers. In a recent drive between Ipoh and Campur, two cities on the extreme end of the Malay peninsula, Mr. Malcolm counted thirty-two Fords in 32 miles.

Motor car dealers handle all accessories and parts in these countries, and there are no separate accessory stores such as may be found in this country or garages like those we have. Every motorist has his own garage, which is often a mere shack without walls, in which he keeps his car.

American manufacturers have encountered their greatest difficulties in exportation through their demands for cash in advance from dealers and in the queer prejudices and fancies of the Oriental. The

Asiatics refuse to purchase cars with left-hand drives and will not buy a tire of the demountable rim type or the quick detachable clincher type. They insist upon having a magneto with their machine and, until very recently, in every instance substituted gas or acetylene lamps for their electric light equipment, which they jerked out and threw away. A strong prejudice also exists against electric starters, and these have often been taken out and replaced by the hand crank.

None of the countries in which Mr. Malcolm operates are troubled by cold weather, but all suffer from an extreme moisture that affects the tires and batteries to a noticeable degree. Rickshaws are so numerous in the larger cities that traffic police and regulations have been installed, and the motor cars encounter a strict system, which drivers must obey without question.

Prosperity is general throughout the entire East. The warring nations of Europe have drawn on these countries for tin, rubber, cocoa, sugar, coffee and their other products, and the average plantation and mine owner is easily able to afford a car.

The payment-in-advance system in use between American car makers and the foreign dealers has caused a loss of business to America and considerable delay to the average motorist in the foreign countries. Dealers are often forced to pay for as many as 120 cars before they receive payment for them from the customer, and in consequence they are sometimes unable to finance their business for cars, while they are seldom able to lay out the cost for a fair-sized stock of parts. It is at this point that Speyer, Cole & Co. has entered the field and brought success to itself and its dealers. It finances every reputable dealer who purchases its machines by paying his bill for him in New York and taking his note until he receives his money.

American tire manufacturers have been successful in competition with the foreign

makers, and the United States, Goodyear and Goodrich tires are as much in evidence as the Michelin and Dunlap, which are the foreign casing makers who predominate.

The dealers in every section are white men, who often supervise sub-dealers of the Chinese or Hindoo race. The Chinese have been found exceptionally honest, but lacking in organization ability, and Mr. Malcolm has discovered that he secures the best results when he allows all big deals to be handled by white men.

The future of the motor car business in the Orient looks bright. The war has opened the door for the higher-priced American cars, which formerly were regarded by the natives as inferior to those of European manufacture. The Oriental dealers have been forced to purchase them since the foreign car manufacturers have been devoting their products to war service, and they now find that America makes excellent high-priced cars as well as cheaper ones. It is no uncommon sight, Mr. Malcolm states, to see a half dozen Pierce-Arrow machines on the streets of Siam at the present time.

India Also Contains Opportunities

Further light on the opening in the Oriental field is given by C. C. Devore, Goodyear Tire & Rubber Co. representative at Bombay, India, who has just returned from the land of Maharajah, Gaekwars and other potentates bearing unpronounceable names.

"The opportunities for American business in India are greater than ever before," he says. "There is a big field for motor cars, and they are being bought as fast as they can be shipped into the country. Motoring is popular as the roads are very good. The chief highways are stone-surfaced and are kept in good condition. We have been fortunate in escaping any curtailment of the importation of cars and have not been limited in our gasoline supply, though the price of gasoline, or petrol as it is called here, is very high."

India has about 15,000 cars now, and most of these are American makes, Mr. Devore says. Many of the rajahs have large garages with magnificent collections of cars, including costly limousines. About 500 trucks are used in India, and the field is by no means developed, as this is a small number in comparison with the size of the empire.

Speaking of the Goodyear business in India, Mr. Devore mentioned the neglect of tires. Many car owners leave the operation of the cars to servants, and tires usually suffer from the effects of underinflation and general lack of care.

REPORTS SHOW DETROIT GAIN

Detroit, Nov. 25—The value of motor cars produced in Detroit for 1916 amounts to \$650,000,000 as compared with \$330,000,000 in 1915. Car makers produced 450,000 cars in 1915 and 960,000 cars during the present year, a gain of more than 100 per cent. The report, given by the Bradstreet company, also shows that the motor car makers have erected four individual plants, each costing more than \$100,000, and these include the structures built by the Chalmers, Packard, and Continental Motors.

America Leads in Cars Has More Motor Vehicles Than Rest of the Whole World Combined

Of the 3,108,472 Machines in Use
June 1, 2,400,000 Were in U. S.

FIGURES compiled show that there were 3,108,472 motor cars in use in June, 1916, throughout the world. Of this number, the United States had 2,400,000—far and away the largest majority. The island of British North Borneo has the smallest number, five. Honduras, down in Central America, has the next smallest, nine, and the island of Samoa, down in the South Seas, has the third smallest number, ten.

The wonderful strides the industry has taken in the United States are shown conclusively by these figures. The United States has nearly 2,500,000, while Great Britain, her nearest rival, has only 276,699. France stands next to Great Britain with 98,400; Germany next to France with 71,455; and Canada next to Germany, with 55,660. Australia has 20,350 cars; Russia, 15,360; and Argentina, 12,550.

It is safe to say that by far the largest percentage of cars in every country are of American make.

RULE TANK TRUCKS FROM STREETS

Boston, Mass., Nov. 25—In the interest of public safety all the big motor vehicles which carry oil and gasoline are to be barred from the congested streets of the shopping district during the holiday season. The street cars have been ordered off Washington street where they pass the department stores until after January 1. Now Fire Prevention Commissioner O'Keefe has sent a communication to the oil companies requesting them to keep their vehicles out of the district, and while it is not an order it will be obeyed.

ANNUAL OLDSMOBILE SHOW

Boston, Mass., Nov. 27—The annual fall show of the Oldsmobile Co. of New England, opened this morning at the sales-rooms on Commonwealth avenue. The place is very prettily decorated and the cars are grouped artistically. One of the features is a cutaway eight-cylinder chassis which is the subject of a lecture delivered at different hours by V. L. Pratt from the factory. Another feature is Miss Amanda Preuss, the woman who made

the trans-continental trip alone in an Oldsmobile runabout. She has her car there and she gives details of her experiences. Invitations have been sent to thousands of motorists and there was a good attendance on the opening day.

LOCK LAW A FAILURE

Detroit, Nov. 27—Detroit's experience with an ordinance requiring motor car owners to equip their cars with a locking device supposed to protect them from theft almost caused the city council judiciary committee to place on file a similar measure at its last meeting. A letter received from James Couzens, police commissioner, stated that the police had been unable to enforce the ordinance. He added that since the locking ordinance went into effect in April, 1923 machines have been stolen, while during the same period last year only 798 were taken.

UNABLE TO SHIP CARS

Detroit, Nov. 25—More than \$4,000,000 worth of motor cars are awaiting freight cars to carry them to their destinations. The shortage has become so severe that manufacturers are seeking storage space so that they can manufacture far enough ahead to care for future business.

WILL MANAGE TRACTOR FACTORY

New York, Nov. 28—It is announced that A. E. Schaaf, for many years secretary of the Fiat Automobile Co., Poughkeepsie, N. Y., and previous to that connected with the Pope Mfg. Co., Toledo, O., has united with Carl G. Fisher in the manufacture of a farm tractor and will associate himself with that organization in the capacity of factory manager.

HUPP CAR REACHES SANTA FE

Detroit, Nov. 27—The Hupmobile capital-to-capital party reached Santa Fe, the thirty-fourth capital in its journey on November 23. The car is now on its way to Phoenix, Ariz. The party now consists of C. E. Salisbury and George Lipe, who are driving, and W. A. Krohn, who is taking the still and moving pictures.



Capitol-to-Capital Hupmobile plowing through heavy snow near Medicine Bow, Wyo.

Boston Dodge Celebrates

Dealer Makes Second Anniversary Gala Affair and Invites Car Owners

Took High Honors in Sales, Having Disposed of 3,000 in 2 Years

BOSTON, Mass., Nov. 28—C. S. Henshaw Co., agent for Dodge cars, held a celebration today on the second anniversary of going into business. The sales-rooms were decorated with flags, bunting and flowers, and an orchestra played. Moving pictures showing Dodge cars participating in various events were exhibited. Invitations were sent to all Dodge owners and many of them attended.

Since the first Dodge car was delivered 2 years ago today more than 3,000 of them have been sold in Massachusetts. From nothing at all, the registrations have jumped 350 per cent, the highest recorded among those registering 300 or more cars. From a small store the Henshaw company has expanded until it occupies the largest building on that street, and also a large service station with branches at Worcester, Brockton and Lynn.

What it did this year is worth knowing. It expanded its service station for the fifth time last January; entertained 2,500 people on the Washington's birthday holiday; took an unexampled list of orders at the Boston show in March; opened a branch at Brockton in April; enlarged the Worcester branch in June; quadrupled its factory allotment in July; won a position among the largest retailers of motor cars in the United States in August; opened its Lynn branch in September; ended the military preparedness test with the original Dodge demonstrator in October; and expanded the Brockton branch and held a celebration here this month.

DENIES LAMBERT WAS V.P.

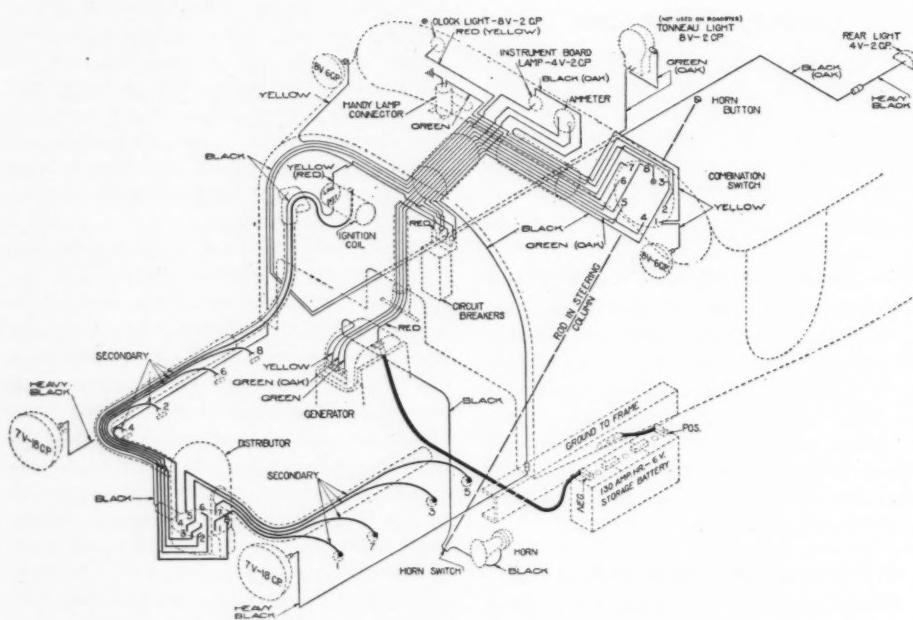
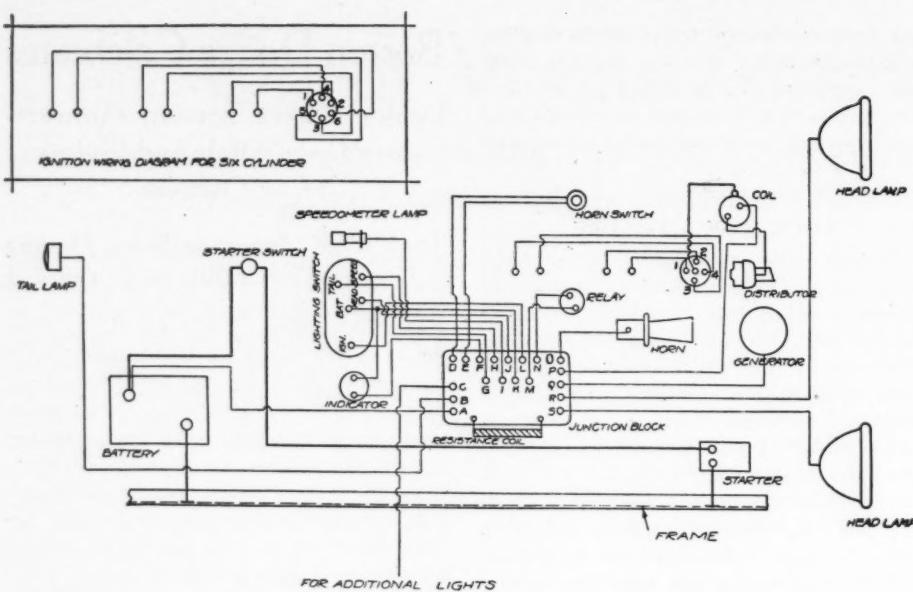
Fulton, Ill., Nov. 25—The Fulton Motors Co. is advising the trade that Harold J. Lambert has never been an officer of the Fulton Motor Truck Co., or ever connected with it in any manner except as a draftsman and that for 3 weeks. It states that it is being annoyed considerably through receiving notices and other matter referring to him as former vice-president of the Scripps Motor Car Co., and also vice-president of the Fulton Motor

Electric Starting and Lighting

(Concluded from page 11)

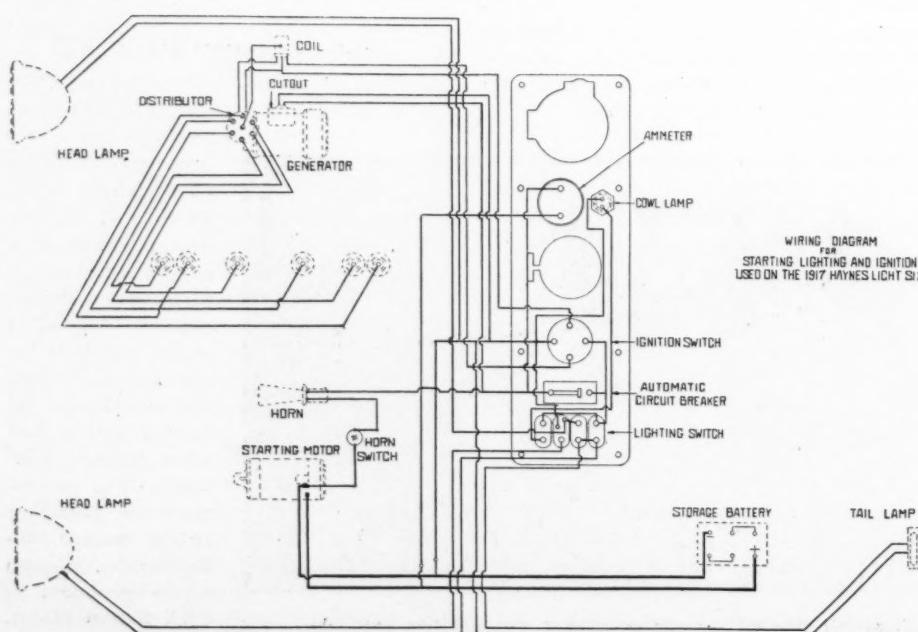
CONNECTIONS OF THE WAGNER SYSTEM ON THE STUDEBAKER

The method of wiring used throughout is the grounded return, or so-called one-wire system. In this system there is but one insulated wire circuit from the battery to each electrical unit. If any of the wires should be removed in making repairs, make connections as shown under car wiring diagram at the left. When repairing wiring or electrical parts first disconnect wires from battery to prevent possibility of short-circuits.



WIRING FOR THE DELCO SYSTEM AS ARRANGED ON THE TYPE 55 CADILLAC

The circuit-breakers mounted on the inner face of the dash are protective devices which take the place of fuses. They prevent the discharging of the storage battery, damage to the wiring to the horn, lights and the ignition apparatus, or to any of these parts in case any of the circuits to or in these parts become grounded. As long as only a normal amount of current is used for horn, lights and ignition the circuit-breakers will not open. In the event of a ground, an abnormally heavy current is conducted through one of the circuit-breakers, thus producing strong magnetism which attracts the armature and opens the contact. This cuts the flow of current. The circuit-breaker protecting the horn, handy lamp and tonneau lamp circuit is known as a lockout circuit-breaker. In case of a ground in any of these circuits, the breaker opens and remains open until the ground is removed. The circuit to the ignition apparatus and remainder of the lights is protected by a vibrating circuit-breaker. In case of a ground in any of the circuits protected by the vibrating circuit-breaker, the breaker will start to vibrate and will continue to vibrate until the ground is removed.

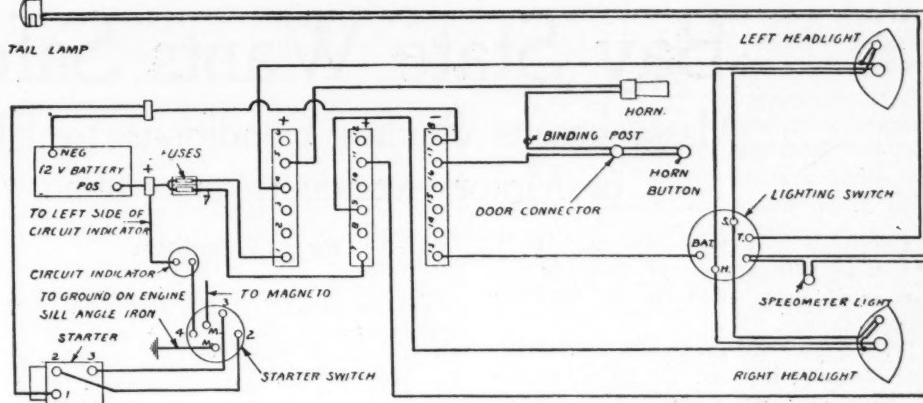


LEECE-NEVILLE AS APPLIED TO THE HAYNES

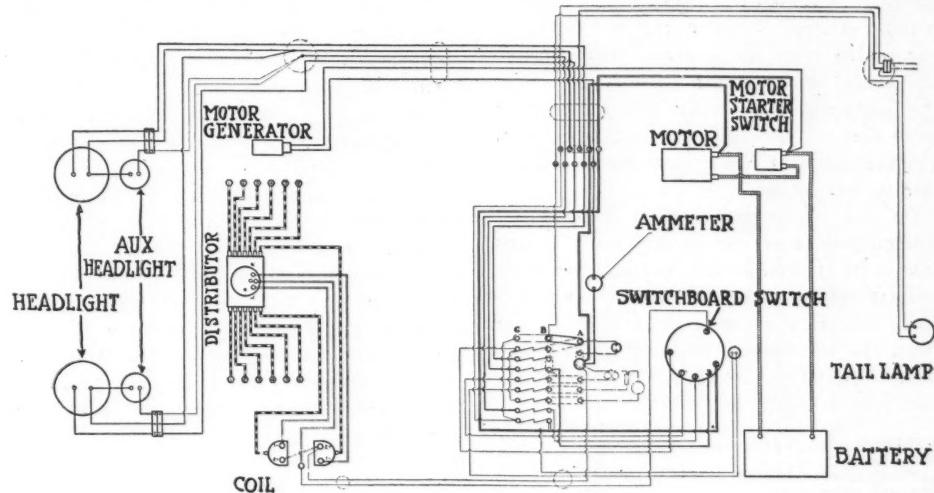
The starting motor should be kept lubricated with oil through the ball oilers provided. The generator is mounted on the right side of the engine. The screw plug set in the forward end housing of the generator should be removed and a good grade of cup grease forced in as often as required. A few drops of lubricating oil should be put in the ball oiler on the commutator end of the generator about once every 500 miles. After the generator has been run for a length of time dust will accumulate around the brushes and holders which will tend to destroy their useful functions. This dust is caused by the wear of the brushes on the commutator and cannot be avoided. It is possible for oil to become mixed with this dust and form a gummy paste which sticks to the brushes or holders. This paste can be removed from the brushes with gasoline. The inside of the holders can be cleaned with gasoline on a cloth.

DYNETO WIRING ON FRANKLIN

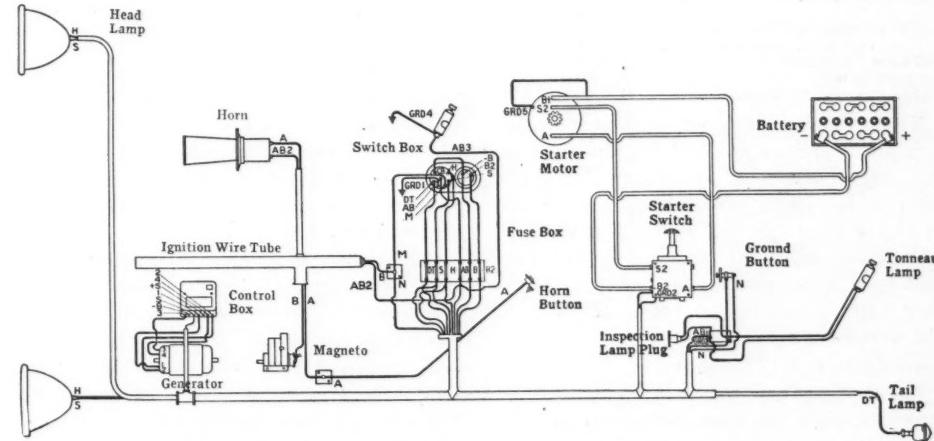
The lighting system is wired independent of the starting system. It consists of electric head, dimmer, tail and dash lights and an electric horn. The head and dimmer lamps are 14-volt and are wired in parallel so that the burning out of one lamp will not affect any other. The tail and dash lamps are 7-volt and are wired in series so that if either one burns out, the other will not burn. The dash light is therefore a tell-tale for the tail light. The horn is a 14-volt one. If both the right headlight and left dimmer go out or if all the other lights go out, first examine the fuses. If the trouble lies in a blown fuse, it may be proved by short-circuiting the fuse clip with a piece of wire. If the lights then burn, the trouble is in the fuse and a new one should be put in.

**PACKARD TWIN-SIX WIRING**

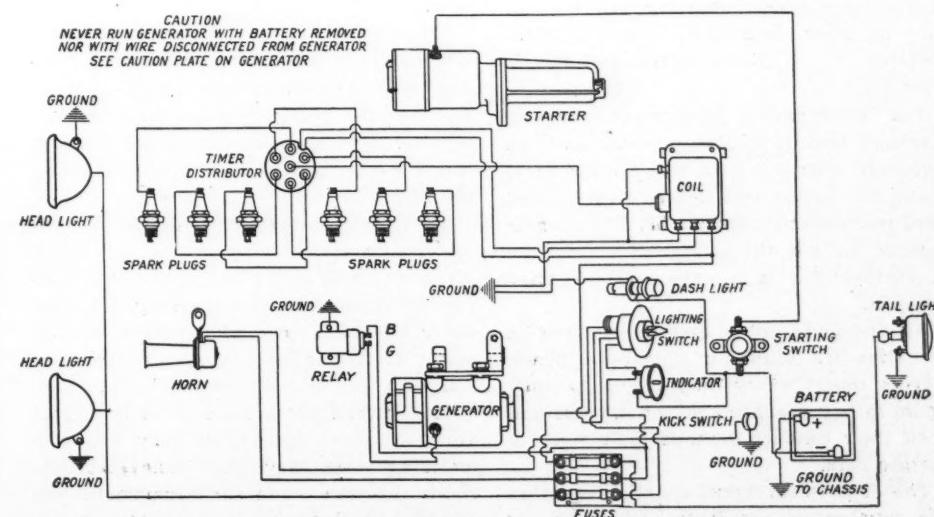
If the ammeter fails to register when the engine is running about 750 revolutions or over 20 miles per hour, look for loose connections or broken wires between generator and battery; also see that the generator commutator is clean and that the brushes are making good contact. Should the ammeter indicate continuously a high current of 25 or 30 amperes it indicates a heavy ground, or short-circuit, in the wiring or storage battery. Disconnect the battery to prevent discharging and examine wiring for short-circuits. The generator regulator is located on top of the generator. It is provided with three split pins, which fit into the three terminal tubes on top of the generator body, and is clamped down in position by a single brass thumb nut, which should be screwed down securely on the leather washer. The generator regulator box contains the regulator and an automatic switch, which closes the circuit to the battery.

**BOSCH WIRING ON MARMON**

All the main lighting leads are protected with fuses. Should any circuit become dead, the fuse affected should be carefully inspected for short-circuits. If a second fuse blows, it is a sure sign of excessive current flow. The armature rotates on large ball bearings mounted at each end; very little lubrication or attention is required. The small oil hole cups should receive a few drops of a light oil every 800 miles. No other attention will be required for at least 10,000 miles running under ordinary circumstances. Then all that should be required would be a little dressing of the commutator with very fine sandpaper. The field fuse is intended to protect the dynamo if one of the cables connected to the battery becomes disconnected.

**WAGNER SYSTEM ON SAXON**

The generator requires but little attention other than to see that the two bearings are regularly oiled. They should be oiled a few drops at a time with high-grade light machine oil after every 1,000 miles' travel. The commutator cover, enclosing the upper end of the generator, can be easily removed, thus exposing the commutator and brushes. The commutator should be kept perfectly smooth and clean. If the indicator fails to show charge at the proper time, the commutator will probably be found dirty or rough. It should then be cleaned with fine-grained sandpaper. Then wipe off the commutator with a dry cloth. To clean the brushes rub with a soft cloth the surface which comes in contact with the commutator. The brushes will wear evenly and smoothly as long as the commutator is smooth and clean. Do not clean the brushes with sandpaper, as this spoils the contact surface. Do not attempt to lubricate the brushes, since they are self-lubricating. The adjusting of the brushes, which are sealed, should not be disturbed.



Bay State Wants Safe Roads

Massachusetts Studies Conditions to Eliminate Causes of Motor Accidents on Public Highways

MASSACHUSETTS is studying conditions with a view of reducing the number of motor accidents on the Bay state highways.

Investigators are working in the various zones assigned to them. To get the proper sub-divisions the highway commission marked on a map the number of accidents which occurred in each city and town in the entire state in previous years. Then by careful study points were found where the accidents were many and where they were few. Hence it was possible to map out the districts and locate the investigators to advantage.

On the investigating force are several college graduates, and as they have had to take a strict civil service examination they possess ability to delve into accidents and make impartial reports. Some idea of the work the commission is doing along these lines is found in the figures in the last report comparing 1914 and 1915 as follows:

	1914	1915
Accidents, non-fatal.....	263	231
Accidents, fatal.....	235	297
Accidents, brief reports.....	325	385
General reputation.....	69	55
Miscellaneous	145	194
Garage dealers.....	189	117
 Total number of reports received from investigators.....	 1,226	 1,279
Garages inspected.....	440	304
Prosecutions.....	77	74
Total amount of fines.....	\$2,435	\$2,760

These figures are those of the investigators alone and do not include the work of the examiners for chauffeurs' licenses all over the state, which jumped last year to 10,418 from 7,504 in 1914. That the examinations are strict is shown by the fact that 3,724 were reported unfit to drive until they had to take other examinations and 611 were rejected finally.

Investigation Is Thorough

The thoroughness of the investigations is shown through the cases looked up outside Massachusetts where our operators figured in accidents, there being two in Vermont, four in New Hampshire, two in Connecticut, six in Rhode Island and one in New York.

The investigating department keeps a thorough record of every case, and an elaborate system is used to learn the facts about any person who figures in accidents. Card indexes show the number of the case; another file has the complete record; and in another file is a card with a brief synopsis.

All the facts about drivers who are on probation are minutely prepared. These drivers report every month just as they would to any probation officer in court and upon their conduct depends their right to operate cars.

The department keeps a daily record of the number of accidents and these are

By J. T. Sullivan

tallied on monthly sheets, and a final report is made at the end of a year. It is divided into sections for day, night, city and country, also cars, pedestrians, other vehicles and motorcycles.

To make more complete the work of the investigators the commission has had mapped out for each one the name of every town and every post office in his district, and a boundary line drawn about it. Each investigator is responsible for all that happens in his territory.

The commission subscribes to a press clipping bureau to get all stories of motor accidents. It also has its own bureau. All the clippings go to the commission who assorts them and they are forwarded to the investigator. The letters that come in complaining about drivers are also passed upon.

An investigator also reads the papers in the territory where he is located, and when he hears of a case he starts immediately to look into it without waiting for instructions. Chiefs of police now notify the investigator in their district instead of the highway commission, thereby saving time.

Commission Rules Off Unfit Drivers

It is surprising how the chiefs of police and other people rely upon the commission to rule off the road some of the unfit drivers. When a man has influence enough to do things without being bothered the highway commission steps in and ends such a driver's career.

The investigator, when he hears of a case, goes about it like a detective, examines all the witnesses, gets all the facts possible and then makes his report. He gives the facts first; then draws a diagram of the scene; gives his opinion as to whether or not the law was violated by the participants, and finally a summary of the case.

These go to the commission for final decision unless it is a very minor case. Tuesday and Wednesday are given over to hearings and going over the investigators' reports. So that there is no delay, a driver learns within a week or two what decision the board has made in his case.

The work of the inspectors is checked up very carefully every month and a final report is made at the end of the year, giving the number of cases investigated, these being itemized, and the expenses of each man. It is possible in a few moments to tell what any one has accomplished.

The investigators mail a daily report from whatever place they may be, summarizing what they have done that day. From the time when the department was established there has never been an in-

stance where any one of the investigators has been charged with partiality.

As many of them now operate their own cars in covering their districts they are able to note cases of reckless drivers and infractions of garage and other laws. Occasionally they see young boys and girls, or women, driving cars that they believe have no right to do so, and they get the facts. Invariably the registration of the owner is suspended.

If anyone has an idea that the highway commission does not go into the accident cases thoroughly he should make some comparisons with what other states do. Some time ago the commission asked some other state commissions what they did in such matters.

Reports From Other States

California reported that in 3 years it has revoked about twenty-five licenses, chiefly for intoxication and reckless driving. Connecticut said that there were 147 suspensions and revocations in 1913, 176 in 1914 and 314 in 1915. Delaware revoked seven in 1915. Illinois records failed to show any suspensions in 3 years.

Maryland in 3 years dropped 132 licenses. New Hampshire had twenty-five court convictions in 1913, eighty-two in 1914 and 262 in 1915, and most of the drivers lost their licenses. In New York since 1910 only 130 convictions were certified to the commission, and of these but forty-nine were found to be registered owners or chauffeurs and thereby lost their licenses.

Pennsylvania from 1906 to November 15, 1915, revoked twenty licenses, thirteen being registrations, six drivers' and one a dealer's license. In Rhode Island ten lost their licenses in 1912; twenty-six in 1913; forty-four in 1914. Vermont reported sixty-four licenses revoked in 1915. In New Jersey there were eighty-five in 1913; 188 in 1914 and 200 last year.

In these eleven states 960 licenses have been revoked in a period that covers from 3 to 9 years. Yet in Massachusetts 1,153 licenses to operate cars have been suspended or revoked in 1 year. Practically no other state has any investigators, and those who have adopted them took the idea from Massachusetts.

Very often, although a man may be found not guilty in court, the highway commission, after an investigation and a hearing, finds he was to blame and takes away his license. Very few if any other states bother with hearings to determine the guilt or innocence of a driver. The Massachusetts commission held 432 public hearings last year.

So much for the state authorities. The Massachusetts State Association, through

its clubs, has planned a campaign to aid in suppressing the reckless drivers and the violators of other parts of the motor laws, particularly the headlight law. To every member of the association through its various clubs has been sent the following letter:

"Will you please do your share and aid the Massachusetts State A. A. in trying to make the highways safe for all travelers by reporting to your club officers the numbers of any cars that you may see whose owners have made no attempt to comply with the headlight law, and also any instances you may note of reckless driving.

"Your club will then investigate it through its safety committee and if the facts warrant it a report will be lodged with the highway commission. The latter body will be glad to take action upon any complaint our organization may file with them. Be accurate as to time, place and numbers. With more than 2,000 members the Massachusetts State A. A. Clubs should be able to do effective work."

Eliminating Headlight Glare

The above letter was evolved by one of the officials of the Bay State A. A. after a conference with the highway commission. That body explained its position clearly in regard to the headlight law by stating that some devices are all right with proper focusing and the right power bulbs, but when out of focus and with big candle power bulbs they are not right, so if they were approved they would be violators of the law with the consent of the commission.

Next comes the railroad authorities. As a result of investigations here and elsewhere the New York, New Haven and Hartford Railroad has sent to all the motor clubs in the state a letter requesting that co-operation be given toward eliminating grade-crossing accidents. The letter follows in part:

"With the object of securing the co-operation of motorists and drivers of horse-drawn vehicles, we are waging a safety-first campaign to minimize accidents at grade crossings.

"This campaign has been discussed and worked out at staff meetings of the operating department. Investigations have been made already at several important grade crossings, and many individual drivers have been written to requesting their co-operation.

Instinct to Take a Chance Blamed

"The principal cause of the majority of accidents at grade crossings is the gambling instinct to take a chance. Experts on accident prevention long ago reached the conclusion that no matter how many laws might be passed or how many safety devices installed there could never be a successful reduction of these persons in whose interest the precautions were taken. This applies to grade-crossing accidents as well as to the large class of industrial accidents.

"As a result of the investigations made so far by us numerous letters have been written to owners of motor cars calling attention to the carelessness of drivers when crossing the railway tracks at certain crossings. The majority of these letters disclose that the drivers did not slow down when approaching a crossing and that they drove over the crossing at a high rate of speed.

"A large number of cases have been reported of drivers passing crossings without making any observations whatever as to whether a train was coming or not. Some of these drivers were engaged in conversing with passengers in the machines, others, waving to passers-by, while one driver was putting on his gloves and consequently did not have his hands on the wheel or brakes of the machine.

"In the letters which have been sent out to the owners of cars it is pointed out that if the speed of the machine is lowered and observations made in both directions to make sure the way is clear, grade crossing accidents will be minimized. We request that all visible and audible warnings be heeded."

PFEFFER TO LEAVE CHALMERS

Detroit, Mich., Nov. 28—Special telegram—C. A. Pfeffer, vice-president and assistant general manager of Chalmers, will retire shortly from the company to enter business for himself. He will remain as a stockholder and director.

ST. LOUIS GIVES PARKING SPACE

St. Louis, Mo., Nov. 25—The police traffic bureau has provided all-day parking space for 475 cars in the congested district of the city and it hopes that more space can be provided at once. Many days during the summer, most of this space was occupied daily. One-half of this space is vacant lots that have been turned over to the police; others are little-used streets, around the city hall, courthouse and other public buildings where there is plaza space near the curb. Twelfth street, which is very wide, has parking space for two lines of machines in the middle, without any congestion.

Traffic Needs Decide Parking

Aside from these places, parking is limited to 2 hours in the congested district—the principal business part of the city, including the shopping district. In front of business houses parking is limited to 30 minutes. The traffic police interpret business houses to suit traffic needs. On two-way traffic streets machines are parked parallel with the curb. On one-way traffic streets machines are placed at a 45-degree angle on the right-hand side of the traffic—the car line. Parking is prohibited for the length of a street car at each corner where cars stop. The parking places on streets are set apart by white painted lines and iron stand signs set out the safety zone for getting on and off cars. The police prohibit all parking

on such streets as they deem necessary, such as heavy traffic streets in commission district, also they refuse to let machines stop except to let out passengers at certain business houses. Outside the irregular congested district, the bounds of which are fixed at will by traffic bureau decree, approved by the police commissioners, there is no limit on parking except on narrow streets occupied by two car lines. The ordinance on which the present regulations are based was passed last May and there have been but few arrests. The police paste notices on cars that have violated a rule and take the number of the car. A third notice brings a police court summons, but very few of these have been issued. The terms of the ordinance are elastic and its enforcement and observance mostly a matter of common sense on the part of the car owners and the traffic policemen.

NEW WHEEL CORPORATION

Chicago, Nov. 28—The U. S. Wheel Corp. is a new organization formed for the purpose of manufacturing the Baker pressed-steel wheel for motor cars, motor trucks, tractors, etc. This concern is an outcome of the Baker Wheel and Rim Co., of this city, a \$50,000 corporation organized for the development of the Baker wheel. The U. S. Wheel Corp., which has absorbed the Baker Wheel and Rim Co., will have a large capitalization.

The factory location has not yet been decided upon and at the start most of the production work will be done by pressed steel specialists. Production will be started soon after January 1. The Baker Pressed-steel wheel is a flat-spoke type with spokes arranged bicycle wheel fashion and held under tension. The United States Wheel Corp. will have for its president Chas. G. Halley, a Chicago man, representing financial interests. Joseph A. Anglada, consulting engineer, of New York, will be vice-president. Erle K. Baker, inventor of the wheel, will be secretary. Mr. Baker is best known as the inventor of the Baker split rim, which is now used exclusively by the General Motors Co.

PARKING AT ST. PAUL

St. Paul, Minn., Nov. 24—The city council recently agreed to an ordinance covering parking of cars in city streets. It prohibits parking more than 30 minutes at any point except recognized cab stands within a territory in the business center five blocks by three. The rule is effective except Sundays and holidays between 8 a. m. and 6 p. m. Parking within 15 feet of a fire hydrant is prohibited. A machine may remain an hour in case it has an accident.

An amendment was made to permit colored light signals on cars to indicate right and left turns. The police will be directed to enforce the headlight ordinance requiring rays to be no higher than 3 feet 75 feet ahead of the car.

Ohio Road Legislative Campaign

Federation to Ask for Restoration of One-Half Mill State Levy

COLUMBUS, O., Nov. 25—The legislative committee of the Ohio Good Roads Federation decided to bring before the next legislature provisions for the restoration of the one-half mill state levy, and the extension of the principle of state aid in road building to include the federal government as made necessary by recent federal legislation; the retention of motor car license fees by the state for repair and maintenance purposes, so that the contracts with the counties for the permanent maintenance of state aid road by the State shall be faithfully executed; the granting of more latitude in local taxation so that revenues for road construction purposes shall not be restricted by present tax rate limitations when authorized by popular vote; the retention of present county and township general and special levies in their present status, except as before stated, and with some added degree of flexibility in their operation and the simplifying of local legislative procedure for bond issues.

It will ask for a clearer classification of all roads in distinct systems, with a more definite assignment of powers and duties to the administrative authority of each unit; the numbering of all roads in each unit for the purpose of establishing a basis of cost data for construction and maintenance purposes; the provision for a plan of mandatory maintenance applicable to all units of administration; the amendment of the statutes relative to the control of vehicle traffic so that they are in line with the present day uses of the public road by both horse and motor power vehicles, and the enactment of a new bridge code providing uniformity, strength, safety, capacity, durability and economy in bridge building.

STUDEBAKER SERIES 17 ANNOUNCED

Detroit, Mich., Nov. 27—Special telegram—The Studebaker program for 1917 will include a four-cylinder and six-cylinder chassis. These are known as Series 18. Both these chassis and the bodies are considerably refined and improved, in the direction of greater comfort and convenience for the passengers. Fundamentally neither chassis has been altered.

Among the important changes are a reversible seat so that the passenger next to the driver can face either front or back. Both front seats are adjustable for different leg lengths and on the backs of the front seats there are flexible leather robe straps. The tonneau is roomier because of a new design of auxiliary seats which fold under the rear seat instead of against the back of the front seat. These new seats are now arm chairs.

In the engine the pistons have been lightened to some extent, reducing vibration and in redesigning more positive oil feed is given. Although the rear axle is quite similar to last year's Timken bearing design, it has been materially strengthened and in the electrical system the characteristics have been altered to give about 12 per cent greater starting torque.

There is a new convertible top, known as Every-Weather, which fits to the touring body providing a sedan when in place. Better equipment is provided particularly in the way of Blackmore door curtain openers which permits the side curtains to open with the doors and also a Yale pin-tumbler lock for the ignition switch. In the four there will be a three-passenger roadster at \$930; a seven-passenger touring car at \$940 and a three-passenger landau roadster at \$1,150. In the six there will be a three-passenger roadster at \$1,170, a seven-passenger touring at \$1,180; a three-passenger landau roadster at \$1,350; a seven-passenger touring sedan at \$1,700; a four-passenger coupe at \$1,750, and a seven-passenger limousine at \$2,600.

PONTIAC OUTLOOK BRIGHT

Detroit, Nov. 25—A banquet held at Pontiac last Thursday night promised the city the brightest and most prosperous financial future in its history. There were nine new companies engaged in the manufacture of cars and parts represented, who promised approximately \$50,000,000 worth of business to the city for the coming year.

The Olympian Mfg. Co., employing 300 men with a weekly pay roll of \$6,000 estimated \$2,000,000 worth of business for 1917. The Oakland Motor Car Co., em-

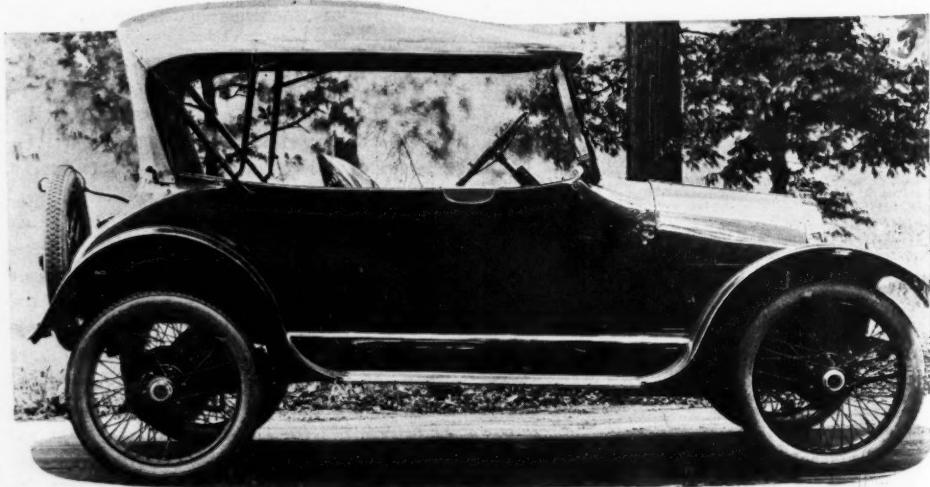
ploying between 1,000 and 1,500 men with a monthly pay roll of \$65,000 to \$100,000 estimate business for the coming year at from \$40,000,000 to \$50,000,000. The Monroe Motor Co., employing 500 men with a payroll of \$9,000 weekly, estimates its next year's business at \$4,000,000. The American Forging and Socket Co., employing 60 to 80 men, weekly payroll \$1,200 to \$1,600, estimate \$430,000 in 1917. The Michigan Drop Forge Co., employing 97 men, has a weekly payroll of \$2,225 and estimates its business for next year at \$388,000. The Columbia Truck & Trailer Co., employing 50 men with a weekly payroll of \$1,500, makes an estimate of \$4,000,000 in 1917. The Markley Handle Co., employing 21 men, with a weekly payroll of \$400, estimate their business for next year at \$50,000.

GEORGIA-BANKHEAD BODY FORMED

Atlanta, Ga., Nov. 25—At a meeting of representatives of five Georgia counties, Douglas, Fulton, Cobb, Haralson and Carroll, held at Douglasville, Ga., this week, a permanent organization of the Georgia-Bankhead Highway Association was formed. W. W. Heaton, Tallapoosa, was elected president, Tom Wilson, Fulton County, treasurer and secretary, and one vice-president was elected from each of the five counties.

NEVADA FOR BETTER ROADS

Los Angeles, Cal., Nov. 25—Southern California good roads workers have been active in Nevada recently and as the result the citizens of that state will vote upon a constitutional amendment to increase the borrowing power of the state from \$600,000 to \$1,750,000. In event of success the next state legislature will be asked to vote an appropriation of \$1,000,000 and create a state highway commission to supplement the efforts of the individual counties to improve the roads. The Lincoln highway will be the first road improved, according to present plans. For



The Overland new country club roadster on the model 75-B chassis. This, the latest offering of the Willys-Overland Co., Inc., has a standard finish of gray with red wire wheels. An extra wheel goes with the equipment. The price is \$695.

more than a year southern California enthusiasts have been trying to induce Nevada to improve the roads. A direct road leads from Ely, Nev., to Los Angeles and the latter road in California is to be improved when Nevada does its share.

ARROWHEAD TRAIL OPENED

Los Angeles, Cal., Nov. 25—A new tributary to the Lincoln highway has been opened this month in the Arrowhead trail in Utah which has now been completely reclaimed. The first tour along the new route was made a few days ago from St. Bernardino, Cal., to Salt Lake City by the engineer in charge of construction.

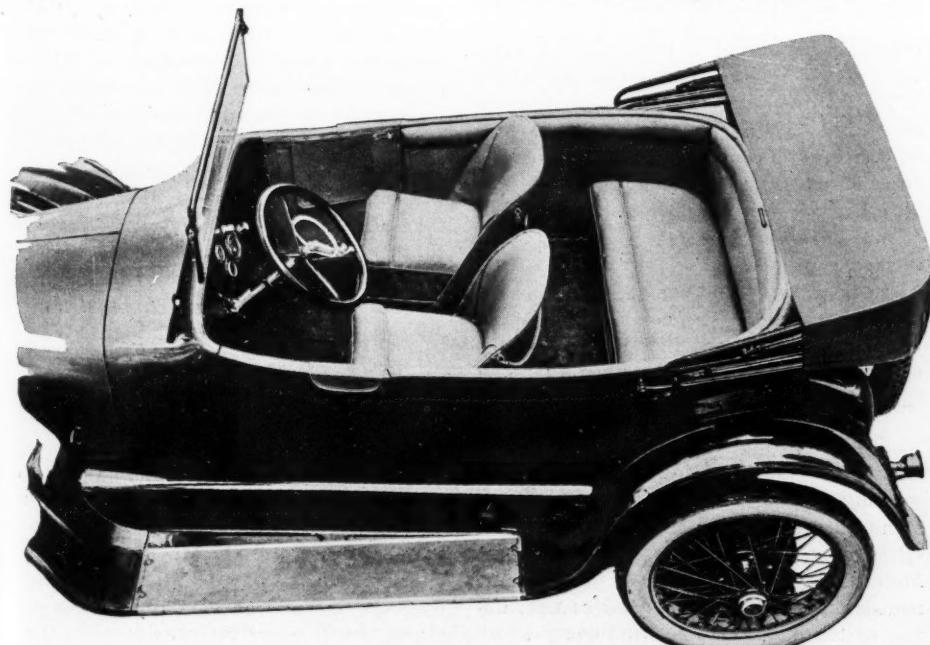
The new motor path runs through a picturesque part of the Far West, along the route of the Old Mormon Path, and leads past old forts and pioneer ranch houses. The trail at one point passes the ruins of the first Finnish settlement in America.

ROAD ENGINEERING CONFERENCE

New York, Nov. 27—Plans have been perfected for a national conference to discuss the subject of highway engineering instruction in the civil engineering curricula of universities and colleges. The meeting is to be held December 29, at 8:30 p. m., in the assembly hall of the Automobile Club of America.

It is under the joint auspices of the Society for the Promotion of Engineering Education, the American Association for the Advancement of Science, the National Automobile Chamber of Commerce, the Automobile Club of America and the National Highway Association.

Preparation of the program is actively under way, and the papers presented and the discussions upon them will be published in the proceedings of the Society for the Promotion of Engineering Education.



Seating arrangement of sport model Overland showing the peculiar boat-like interior and abundance of leg room for the rear-seat passengers. Entrance to the rear compartment is gained through the divided front seats

6,000 Overland Dealers to Meet Salesmen, Service Men and Interested Business Men to Inspect Factory

TOLEDO, O., Nov. 25—The Willys Overland Co. will hold a dealers' convention at the company's factory December 4 to 23. Nearly 6,000 dealers, their employees and their guests are expected to attend. Not only Overland and Willys-Knight dealers from all sections are making plans to visit Toledo, but many are arranging to bring their salesmen, service men and leading business men from their home towns to inspect for themselves the size of the Overland factory.

Factory tours, lectures and talks outlining new sales and service policies, minstrel and vaudeville shows, banquets, smokers and band concerts will form a part of the program planned for entertainment.

About twenty-eight special trains will run from all sections of the country and the various Pullman cars will be held on the company's premises, the trains so parked that they will serve as sleeping quarters for the men, while the eating and entertaining will be done in the new administration building which the company recently occupied.

FORM-A-TRUCK EXTENDS LINE

Chicago, Nov. 27—Additional capital brought about through the re-organization of the Smith-Form-A-Truck Co., and the taking over of this concern by the newly-formed Smith Motor Truck Corp., is to make possible the extension of this particular truck-forming attachment to cars

other than Fords. Already attachments are being made for such cars as Dodge, Maxwell, Buick, Overland and Chevrolet. The new unit for application to other cars will be known as the Universal, although this term does not have its usual meaning since units under this name will not apply to all cars for some time.

Attachments for Maxwell and Chevrolet have a frame of 4-in. channel section, the same as the unit for Fords, and they sell at the same price as the Ford attachment, or \$350. This unit will convert cars into a 1-ton truck but the larger size, the frame of which will be 5-inch channel section, will be designed for loads of 1,500 pounds.

Capacity of production of the attachment that has been made for Ford cars for the last two years is now 300 daily, and as announced last week, additions to the plant will be built which will practically double the floor space and thus the company expects to be able within 3 months to take care of any demand that may come for these units, either for Fords or other cars. At present the company is making an average of one a day of the Universal attachment, but is unable to keep pace with the demand for this particular unit, dealers in some cities asking for them in carload lots.

The method of attachment for the newer units is the same as for the Ford, that is, the rear axle of the car is used as a jack-shaft and thus the converted truck is chain driven.

GASOLINE CARDS IN FRANCE

Paris, France, Nov. 23—Gasoline tickets and a ban on the use of private motor cars, it is stated, is part of a scheme in this country, for regulating the consumption of food and other supplies. If necessary the government will forbid the running of any motor cars except public or semi-public machines.

CHARTER OAK TAKES ROOT

Hartford, Conn., Nov. 25—Early spring is the time at which the recently incorporated Eastern Motors, Inc. expects to have the first car on the market. Charter Oak is the name selected because the car was projected in Hartford, the location of the historic oak tree in which the colonists secreted the charter demanded by the English governor in the good old colonial days.

The Charter Oak is to be a high-grade assembled proposition combining a Herschell-Spillman, six-cylinder engine, a four-speed Brown-Lipe gearset and Timken axles. It is the desire of the Eastern Motors, Inc., to build the car in Hartford.

Would Have Basic Traffic Laws Uniform

Arthur Woods, New York's Police Commissioner, a Champion of Standardization

ARTHUR WOODS, police commissioner, New York City, is heartily in favor of standardizing the basic principles of traffic regulation for cities.

It is his firm belief that any general legislation along this line would have to be so elastic as to give local city bodies in control of traffic, the power to meet peculiar local conditions. In fact, the problem is, in many ways, similar to that confronting the Association of Mayors of the cities of the state of New York, who are endeavoring to provide for a uniform city charter. The mayors have come strongly to the conclusion that their legislation, to be effective, should only outline a sort of general skeleton of municipal charter, which would control the essentials of municipal government but permit the adoption of such minor local regulations as conditions seemed to demand.

The simpler we get these A. B. C.'s of traffic regulation the less accidents we are going to have and out-of-town motorists would never be confused by strange and varied methods, he says. There is no question that a difference in elementary traffic regulations in different parts of the country brings about chaotic conditions on the streets.

Helping the Cause

Unconsciously, perhaps, the New York police department has been helping along the cause of standardization by loaning officers of its traffic divisions to cities that apply for assistance and guarantee the expenses of such officers. In most of these cases, the traffic system prevailing in New York City has been put into effect and found satisfactory. Of course, there are regional peculiarities in almost every city that must have local management; but the motorist has the right to find the fundamental regulations—the means of signaling and normal driving—everywhere the same.

Commissioner Woods thinks it is of the greatest importance that those undertaking to draft a standardized code should be in substantial accord with regard to the problem to be met.

In New York city, the authorities are in a position intelligently to tackle this problem because of the fact that data in connection with every street accident are most carefully tabulated. For example, the records show the time of accident, nature of the vehicle, condition of the machinery, age of the victim, the street conditions, the condition of the weather, whether or not the accident was caused by a violation of existing traffic regulations and



Arthur Wood, New York commissioner of police

other points having a vital bearing upon the underlying causes of street accidents.

The Safety First Federation of America at its last national conference recommended that the New York police department form of recording accidents be adopted in all cities. If this suggestion is acted upon to any considerable degree, a long step toward a rational standardization of traffic rules will have been made.

The physical construction of the island of Manhattan and the fact that, generally speaking, the business area is toward the

CLUB WANTS TRAFFIC UNIFORM

Asheville, N. C., Nov. 24—At the last meeting of the Asheville Motor Club the standardization of motor traffic rules in all cities of 5,000 and over, as outlined in Motor Age of September 28, was unanimously indorsed, and it is the earnest desire of the motor club to bend every effort to bring about this condition, which will be of great help to motorists throughout the country.

southerly portion of the island and the residential area is toward the northerly portion, results, quite naturally, in causing the heaviest flow of traffic to be in a southerly direction in the morning and in a northerly direction in the afternoon. This situation has practically forced the incorporation into the law of a provision to the effect that, other things being equal, a vehicle moving in a northerly or southerly direction on one of the main thoroughfares, shall have the right of way over a vehicle going in an easterly or westerly direction. It would be practically impossible to conduct the city's business upon any other basis, yet this is in substantial variance with almost universally common law and statutory provision to the general effect that, when two vehicles meet at the intersection of two streets, neither vehicle has the right of way over the other solely because of the direction of the compass in which it happens to be traveling. This is mentioned as one of the many local conditions that could not be governed by a hard and fast standardized rule.

INDORSES THE ENO SYSTEM

Bloomington, Ill., Nov. 25—Chief of Police J. J. Jones, who is in charge of the traffic rules here, indorses the Eno system with a few minor exceptions. The streets of Bloomington are too narrow to permit of the reservation of safety zones for the protection of street car patrons. To provide for their safety, however, vehicles are prohibited from passing street cars when the latter have stopped to take on or let off passengers. The Eno traffic ordinance is indorsed with the exception of Section 5 of Article 1. Bloomington requires that when drivers wish to make a turn upon the same street, that they must turn at the end of the block as provided in the Eno system, but must continue to the opposite side of the street intersection, making the square turn and then retrace upon the opposite side of the street.

Chief Jones argues that to turn at the end of the block invites a collision from a car coming in from a side street and which naturally swings to the side of the street occupied by a car coming from an opposite direction. All other sections are approved and have been placed in effect where the width of the streets is sufficient, or where the traffic is heavy enough to warrant enforcement. Chief Jones has given the Eno system considerable study and believes that it is a step in the right direction for uniform traffic regulation, which will be ultimately standardized.

The Motor Car Repair Shop

Building an Electromagnet

NO MATTER what grade of material is used, if the design and workmanship put into building an electromagnet for recharging magnetos is not correct the completed job is very liable to be a failure. Many communications addressed to the Readers' Clearing House department of Motor Age tell of owners or garagemen who have attempted to make up electromagnets without the success they had expected. The design and construction of a very simple charger suitable for operation from a 110-volt direct current lighting circuit is given herewith.

Size of Iron Cores

In Fig. 1 are shown two pieces of cylindrical soft iron, 1 inch in diameter and 6 inches long. These pieces constitute the cores. Cores should be made in one piece, because there is less loss in magnetism than in multiple-piece cores. The dimensions above given have been shown in practice to give the best results. A short and comparatively thick electromagnet is more efficient than a thin one.

Newspaper should be wrapped about the cores, this being put on in layers and over each layer a coating of shellac applied. The paper insulation should be layed on until a thickness of about $\frac{1}{8}$ inch has been built up.

After the cores have been properly insulated, the next step is to wind them. This particular design calls for about 14 pounds of 18 B. & S. gauge, cotton-covered copper wire. This means that 7 pounds or about 1,800 feet should be wound around each core.

With this amount of wire each core will have about 3,100 turns. This, of course, makes the electromagnet one of approximately 6,200 turns. The coils consume 3

amperes. The number of ampere turns equals the number of turns times the number of amperes or 18,600 turns.

A very important thing which must be remembered in winding the wire around the cores is that the windings should be in opposite directions, as shown in Fig. 1. The wire should be started with about 2 feet left over, so that connections with the circuit may be easily made. In winding, each turn should be flush against the previous turn and tightly drawn. It is well to look to the installation of the copper wire frequently as the winding progresses.

After both cores have been wound they should be connected as shown in the sketch. One end of one core is attached to one of the other core. This leaves two ends to be used for connecting to the lighting circuit. A base plate is required for mounting the cores.

A base plate of iron is best suited and this should be of $\frac{1}{2}$ -inch stock big enough to hold both windings. Two holes should be countersunk into the base plate, the diameter of these holes being equal to the diameter of the windings. These holes should be made about $\frac{1}{2}$ inch apart. The cores of the windings must surely touch the base plates. To be sure that they do so they should be pounded in.

Complete Cost About \$25.

The complete cost of this apparatus should be under \$25 when completed. Some means of control must, of course, be had and a switch where the current is taken from the lighting circuit is best suited. The electromagnet should properly charge magneto magnets in two or three minutes.

Few if any motorists take the trouble to periodically examine the wheel bearings and when it is done, it is often too late.

Recently an owner complained that his car when operated at 15 miles per hour or under acted as if one of the tires was deflated, yet the tires were properly pumped to the required pressure. The condition was aggravating, but was allowed to go on because it was not noticeable when the car was traveling over 15 miles per hour and most of the driving was done above that speed. It developed, however, that the cups of the front wheel bearings were revolving in the wheel hub, causing them to wear. Both front wheels showed side play between them and the spindle and when jacked up the wheels wobbled. When in operation the wheels were side slapping and the tires were being ground against the road, thus causing rapid wear.

Front Wheel Bearings Adjustable

In most present-day cars the front-wheel bearings are adjustable and they should be watched and inspected periodically. The time required to adjust a cup and cone or tapered roller bearing is hardly worth considering and the effort will be well worth while. In adjusting the front-wheel bearings the wheel nut usually is made to take up play. The nut should be tightened until the wheel binds and then turned back far enough to allow the wheel to turn freely.

Another thing in connection with wheel bearings is that they often are required to operate without proper lubrication. They may operate for a long time without replenishment, but if grease is not changed periodically, added wear will result.

When one is ready to grease the wheels, all old oil and grit which has worked in should be thoroughly washed out with kerosene. The clean grease should be packed into the bearings.

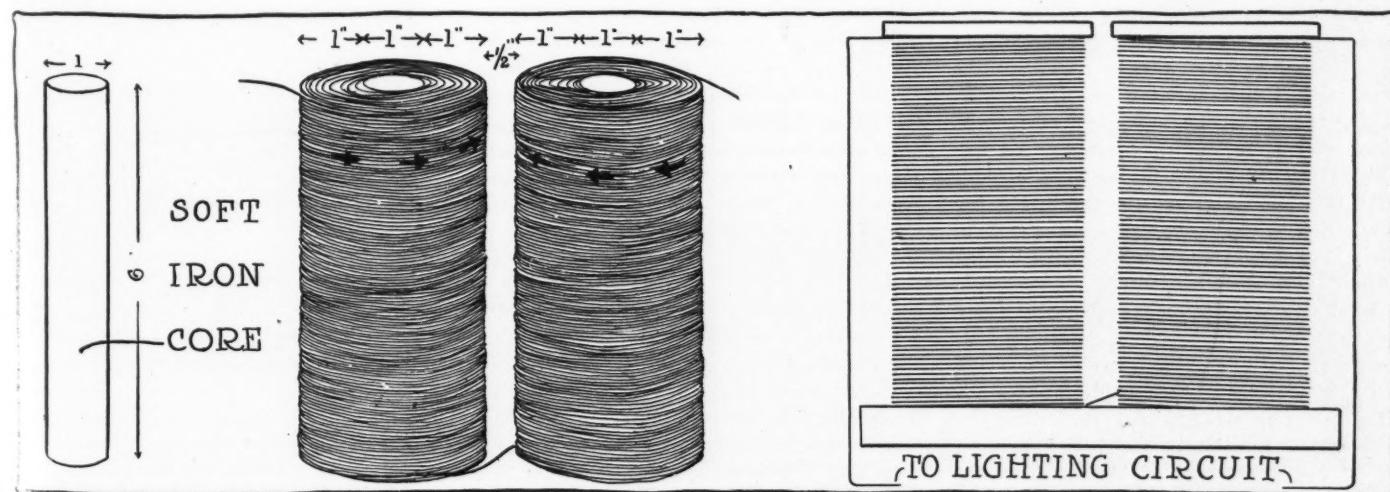
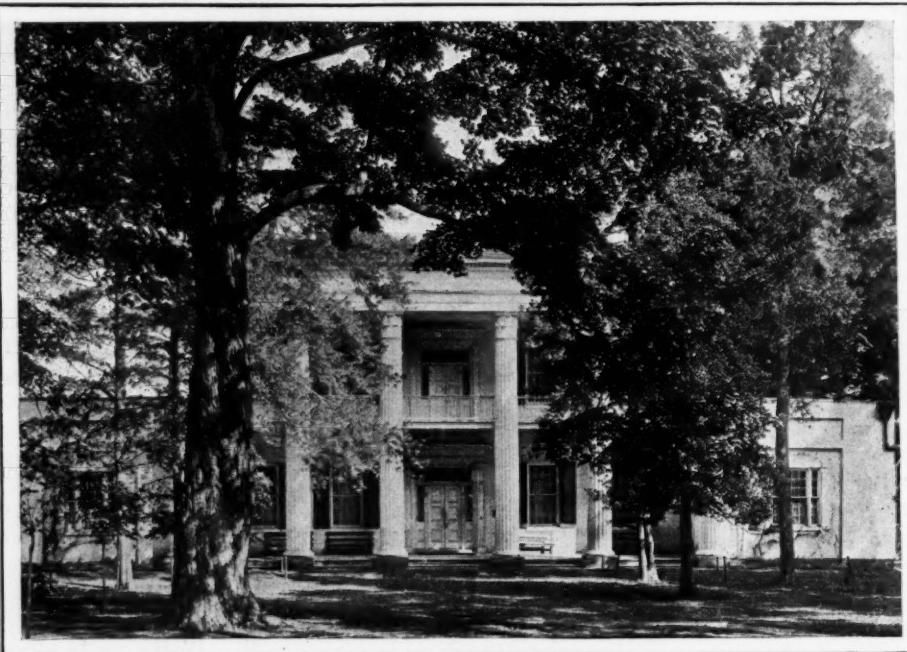


Fig. 1—Showing construction of a magneto-recharging electromagnet. To the left an iron core and two opposite wound coils. To the extreme right the complete recharging apparatus

Nashville-Tennessee "The Dimple of the Universe"

By William K. Gibbs



The Hermitage, home of Andrew Jackson, 12 miles out from Nashville

POPULAR song-writers have syncopated about rivers and lakes, cities and states, but they have overlooked one spot that might give them inspiration, for one especial reason if for no other. People frequent movie theaters to see advertised million-dollar smiles and other equally valuable characteristics of feminine pulchritude. The captivating dimple that made the stronger sex once eager to give up good money for a front row center and later a choice position beside the runway, has been rhymed and sung broadcast and this fact made me wonder as I looked upon Nashville, Tenn., and the country around it for the first time and each succeeding time, why some ambitious song writer has not written a lullaby, a rag or a melody with this particular spot as the locale, for Nashville, with its environs, is affectionately known to Tennesseans as "the dimple of the universe."

That this appellation fits will be attested by the most biased visitor. Built on the banks of the Cumberland river, Nashville is surrounded by a chain or circlet of beautiful hills that stretch in a curve from the river above the city to the river below the city. For possession of the area within this so-called dimple much blood has been shed—Indian and Caucasian—for the

boundary formed by this chain of hills more than once in years gone by has formed a natural breastworks for the defense of the city.

We become interested in cities for the same reasons that we become interested in people. Quite aside from the physical attractions of cities and individuals we find the compass of our esteem forcibly drawn to what they do and what they have done. Being prolific in history and events that have been epoch-making in the development of our country, Nashville possesses both physical and historical charm for the tourist within her gates.

Andrew Jackson was born here and rose from a backwoods lawyer to the presidency. Here were executed the greatest political pageants in American history when the old Whig party was expending its efforts to carry the state for William Henry Harrison in 1840, and in 1844 when Henry Clay was the opponent of James K. Polk. Here Bernard, the great astronomer, paid off the mortgage on his farm by discovering comets. Forces that won the greatest of American victories—the battle of New Orleans—were marshalled in Nashville and from this city marched the troops that forever broke the power of the Southern Indians.



Cedar-lined driveway, leading into the Hermitage. This driveway resembles a huge guitar. This view is of the outer end or finger-board. The path divides before reaching the Hermitage door and follows the general contour of the guitar



Statue erected to the memory of Sam Davis, who forfeited his life rather than betray a friend

In the Civil War Nashville was one of the battle-fields. Grant was making his headquarters here when he was named lieutenant-general of the United States army. Thomas and Hood grappled here for its possession in one of the concluding scenes of the war.

Among personalities of note may be mentioned Sam Houston, one of the most striking figures in American history, Tennessee's bridegroom governor, who left Nashville in disguise after resigning the governorship and separating from his bride in a mysterious manner. He afterwards carved out a remarkable career in Texas, but this city furnished the setting for one

of the most dramatic scenes of his eventful life. William Walker, known as the "Gray-eyed man of destiny," lived in Nashville and the remains of his former home are still to be seen. Thomas A. Edison once worked in a telegraph office in Nashville. This city has given the country two presidents—Jackson and Polk.

Thirty miles away is the scene of the battle of Murfreesboro, where the charge of Breckinridge, second only to Pickett's at Gettysburg, was made. Eighteen miles distant is the bloody field of Franklin, where, following the battle, five Confederate generals lay dead in one place.

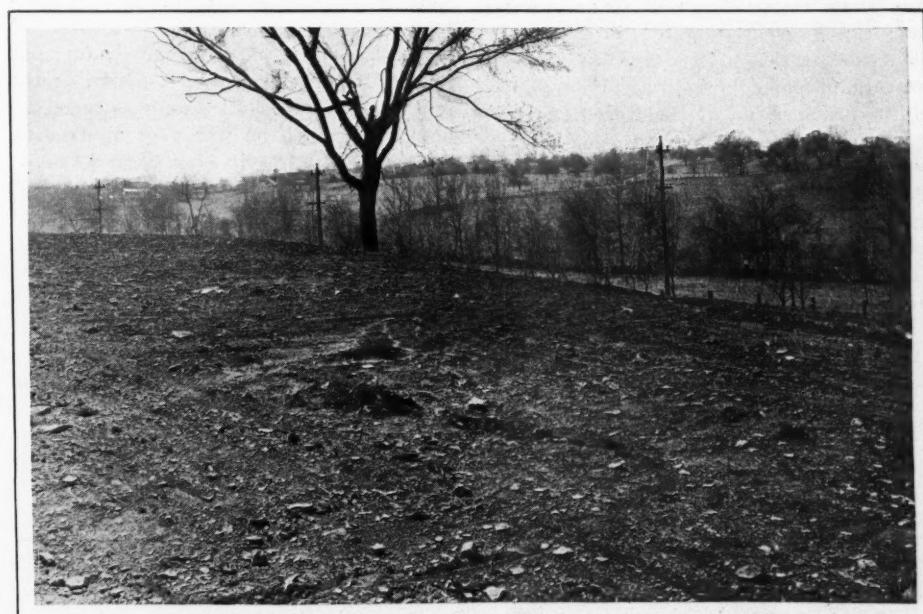
Nashville boasts — she does boast and who can say she has not the right? — of beautiful drives and within Davidson county, of which Nashville is almost the geographical center, there are a network of splendid highways in every direction. There now are more than 300 miles of macadamized roads in the county, for the maintenance of which \$125,000 a year is expended.

The foregoing is a brief resume of what Nashville and the country immediately surrounding it has in the way of physical and historical interest for the tourist.

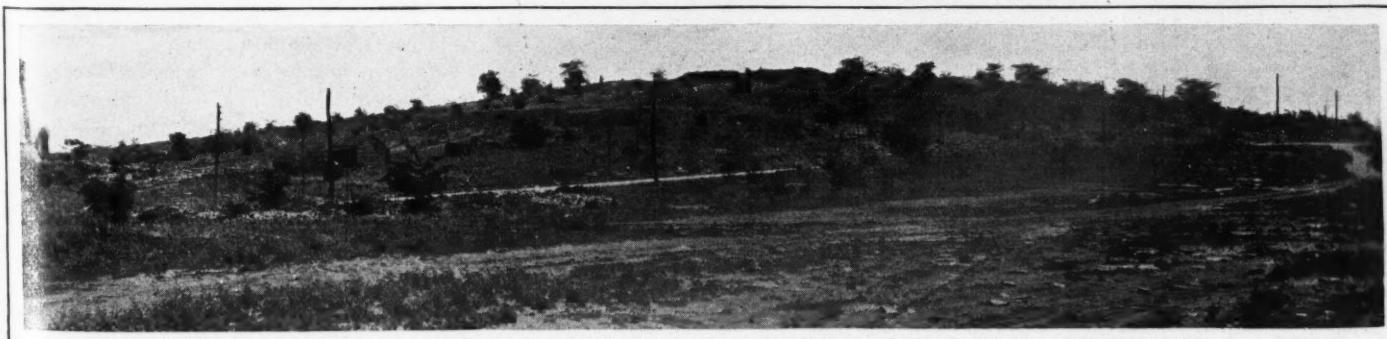
Nashville may well be proud of its characters of distinction and she is. The fig-

ure of Andrew Jackson stands out prominently when one thinks of, or visits Nashville. His name is revered and his old home, "The Hermitage," is still preserved much the same as it was before "Old Hickory" died 71 years ago. The Hermitage is a place that those who love to delve into history are loathe to leave. Here are mementos of the illustrious life of this prominent figure in American history.

The original Hermitage was a commodious, two-story log house, built in 1804 and a part of it is still standing. It was to this humble abode that the conquering hero of New Orleans returned after winning the brilliant victory in 1815 against General Pakenham and the British forces against great odds. The present site was selected and built upon in 1819, of brick made on the place. It burned in 1834 and was immediately rebuilt on the same foundation and using some of the old walls. In construction it is typical of architecture of the South during that period. Setting far back from the road the picture it presents to the visitor has that touch of something different; that not-easily described attraction that holds our interest without our knowing just why. Massive and grizzled cedars line the drive from the road up to the house. The layout of



The battlefield of Nashville, where a half century ago the cannons took their toll



Grim Fort Negley, on St. Cloud hill, bears notable earmarks of the struggle between the North and South

this drive is perhaps the only one of its kind extant. It is shaped like a huge guitar. From the gate the driveway leads straight toward the main entrance to the Hermitage for perhaps 200 feet and it is not hard to imagine that the gray old cedars on each side mark off the frets of the guitar keyboard. Then the drive divides and follows the general contour of the body of a guitar, meeting again just in front of the doorway.

Hermitage Sold to Tennessee

In 1856 Andrew Jackson, Jr., who bore the relationship of nephew to "Old Hickory," yet was known as his son, through adoption when an infant, sold the Hermitage farm of 500 acres to the state of Tennessee. He, with his family left the Hermitage, but at the solicitation of Governor Harris he returned in 1860 to become custodian until further disposition of the property. Tennessee offered the Hermitage to the government for a branch of West Point, but the civil war prevented consummation of this plan. During the rebellion the family of Andrew Jackson, Jr., remained at the Hermitage, General Thomas, commandant at Nashville, detailing a guard to protect it from devastation. Five sons of Andrew Jackson, Jr., joined the Confederate service, but only one returned. Jackson, Jr., died in 1865 and his widow was given the privilege of tenant during her life which terminated in 1888. In 1889 the Ladies' Hermitage Association was organized and later was given charge of the preservation of the Hermitage.

The efforts of this organization to preserve and beautify this historic old home have borne fruit and the garden would do justice to the art of a horticulturist and landscape gardener. In the garden is the tomb of the Jackson family.

In the stable is still to be seen the old stage coach used by Jackson at the White House for all



Longview, residence of James E. Caldwell, on Franklin road, typical of the residences to be seen on every road radiating from Nashville

state and ceremonial occasions, as well as for several trips between Washington and the Hermitage, each of which required 30 days. The skeleton of the phaeton is all that remains of the vehicle presented to Jackson by the Democratic-Republican citizens of Philadelphia. It was made from timbers taken from the old ship "Constitution."

Clover Bottom, on the road leading out to the Hermitage from Nashville, is the spot where Andrew Jackson once raced his horses, of which he was a great devotee. In 1806 as the result of a quarrel over a forfeited horse race Jackson challenged

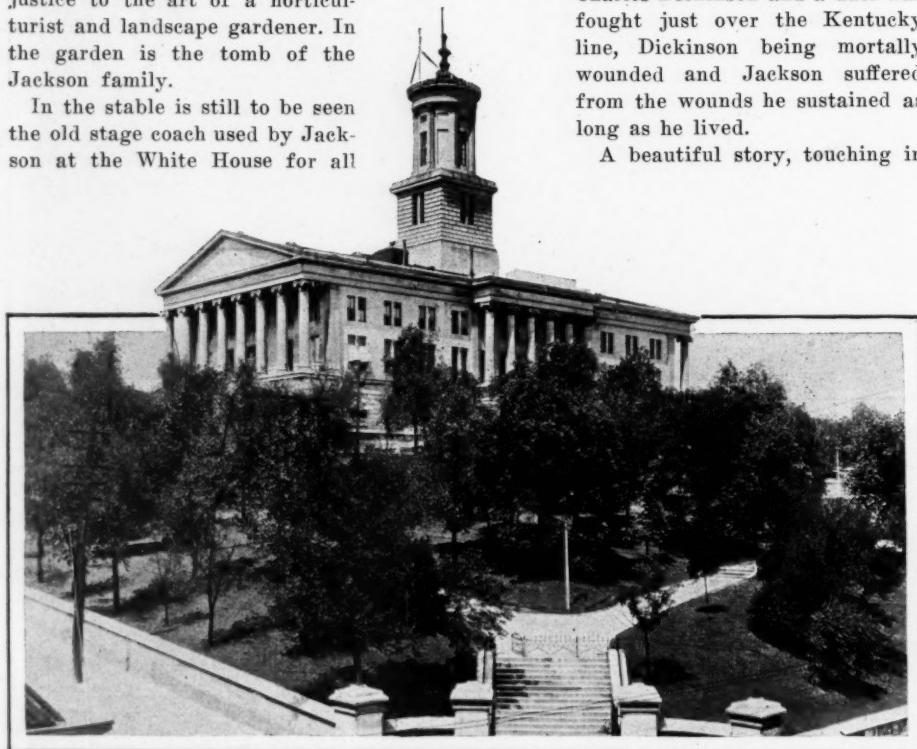
Charles Dickinson and a duel was fought just over the Kentucky line, Dickinson being mortally wounded and Jackson suffered from the wounds he sustained as long as he lived.

A beautiful story, touching in

pathos, is that of Sam Davis, Nashville's hero immortal. The story of Sam Davis is known to every man, woman and child of the city, and it might not be far amiss to say of the whole South. At the southwest corner of the capitol grounds in Nashville is a statue erected to the memory of Davis and as a tribute to the greatness of his character. The story is a simple one. At the outbreak of the war Davis enlisted and became a member of General Bragg's army and later became a member of Coleman's Scouts, a company that operated much to the disadvantage of the Union troops. Grant was at Chattanooga and was anxious to break up the operations of the scouts. Davis had been intrusted with certain letters and data of importance to General Bragg. He was captured and the papers discovered on him. Given the option of leniency if he gave information concerning the source of the papers found upon him, or death if he did not, he replied: "I know, general, that I will have to die, but I will not tell where I got the information, and there is no power on earth that can make me tell. You are doing your duty as a soldier and I am doing my duty to God and my country." He was executed with a regret on his lips that General Bragg's forces had suffered defeat at Missionary Ridge.

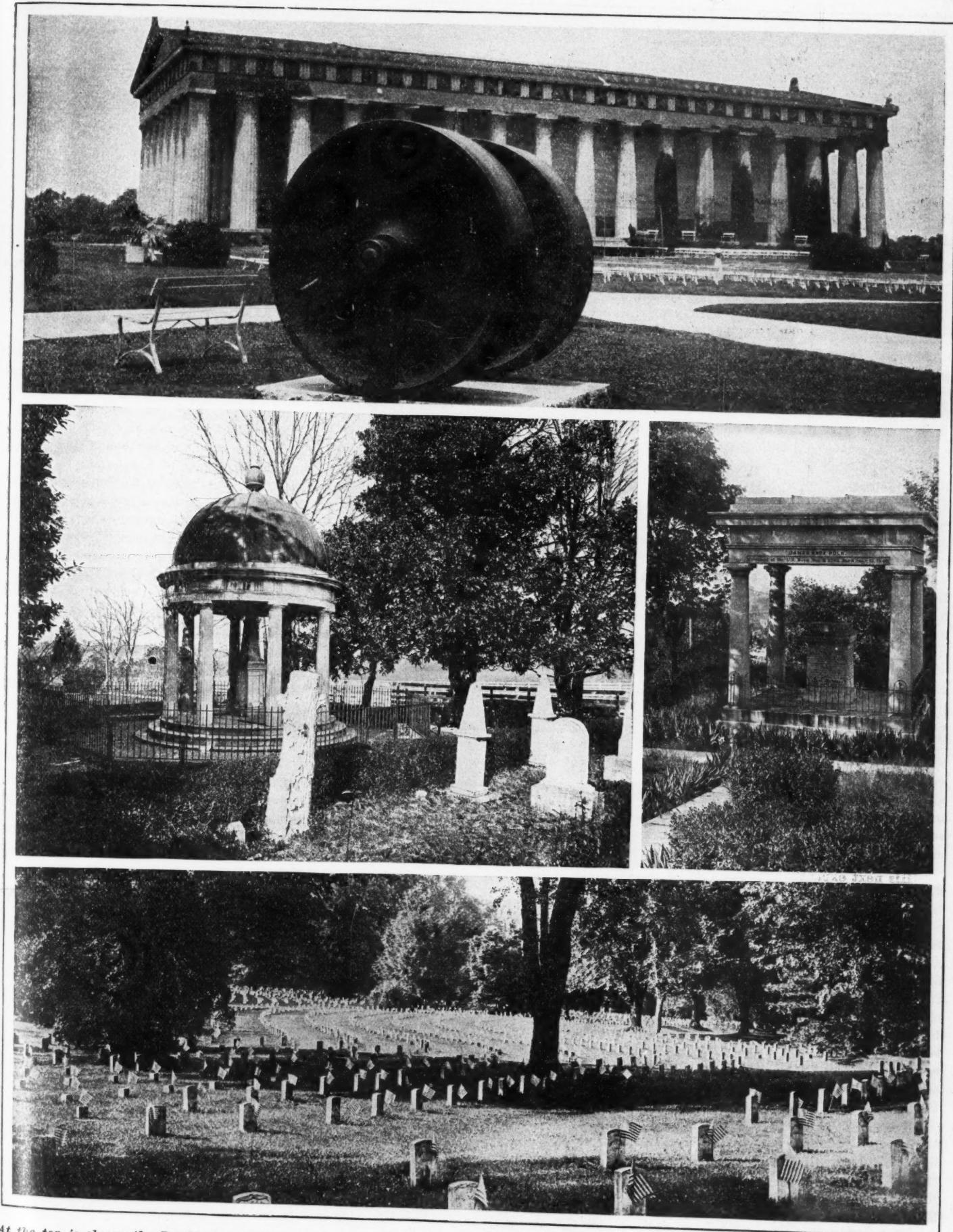
"Gray-Eyed Man of Destiny"

Scarcely a vestige remains of the birthplace and boyhood home of William Walker, romantically named "the gray-eyed man of destiny." His old home was at 142 Fourth avenue, North. The early life of Walker has no particular significance. Later he became a doctor, a lawyer, editor, president of a republic, general, president of another republic; the object of deep concern to England and a thorn in the side of two administrations of the United States, yet he died at 36. He was born in Nashville in 1824, graduated in medicine at 19, but took further studies in



Tennessee's capitol, the tower of which was patterned after the Choragic Monument of Lysicrates, or as it is sometimes called, "The Lantern of Demosthenes," erected in Athens, Greece, 325 B. C.

November 30, 1916



At the top is shown the Parthenon, which was the object of much interest during the Nashville centennial in the late nineties. In the foreground is the old wheels that once were used to grind powder for the Confederate army. In the center and to the left is the tomb of Andrew Jackson and his wife, while in the foreground are the graves of other members of the Jackson family. At the right is the tomb of James K. Polk, eleventh president of the United States, and his wife. This is on one corner of the capitol grounds. At the bottom is a view of the national cemetery on the road leading into Nashville from the north.



Bird's-eye view of the Ward-Belmont college for women. Nashville ranks high educationally

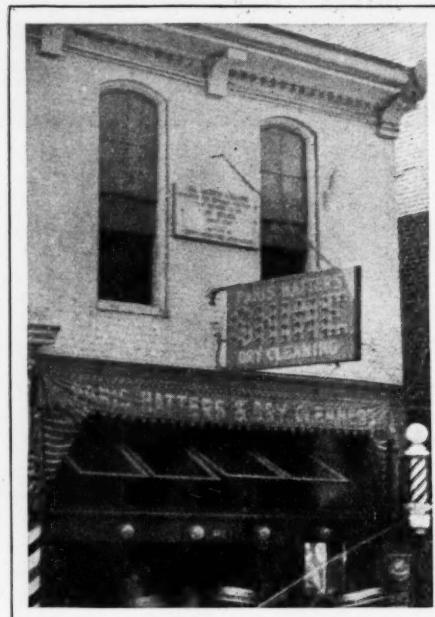
Edinburgh, and then traveled extensively in Europe. In 1850 he went to California after cowhiding a rival editor in New Orleans.

Headed a Republic

In 1853 he went into the province of Sonora in Mexico and proceeded to erect a republic with himself as its head. Its existence was brief, he and his remnant of an army surrendering to a United States officer in San Diego, Cal., early in 1854. That same year he made a contract with the head of the stronger contending factions in Nicaragua to land 300 colonists liable to military duty in that country. He took some men from San Francisco and landed in Nicaragua in 1855, the men being mustered into the army and Walker being commissioned colonel. Later that year the factions made peace and Walker was made commander-in-chief of the army of the entire country. He had himself inaugurated president of Nicaragua in 1856 in which position he antagonized a shipping concern headed by Cornelius Vanderbilt and English interests and brought about an international tangle which he had not foreseen. In 1857 he surrendered to the commander of a United States warship.

His next expedition was with a party of 200 men which he landed in San Juan harbor almost under the guns of the United States warship Saratoga. Again he was forced to surrender to the commander of an American warship. He attempted three other expeditions and two terminated differently than he planned, one by a wreck off the coast of Honduras and the other by being stopped at New Orleans, by the collector of the port. The third, which took him to Rautan, an island off the coast of Honduras, ended by his being taken by the British and put to death.

On the capitol grounds of Nashville lie the bodies of James K. Polk, eleventh president of the United States, together with that of Mrs. Polk. A simple but stately tomb with appropriate inscriptions testifies to the love and esteem in which both were held. The Historical Society of Nashville is custodian of the pen, fashioned from an eagle quill, with which Polk signed the document proclaiming peace with Mexico.



Where Andrew Jackson once had his law office

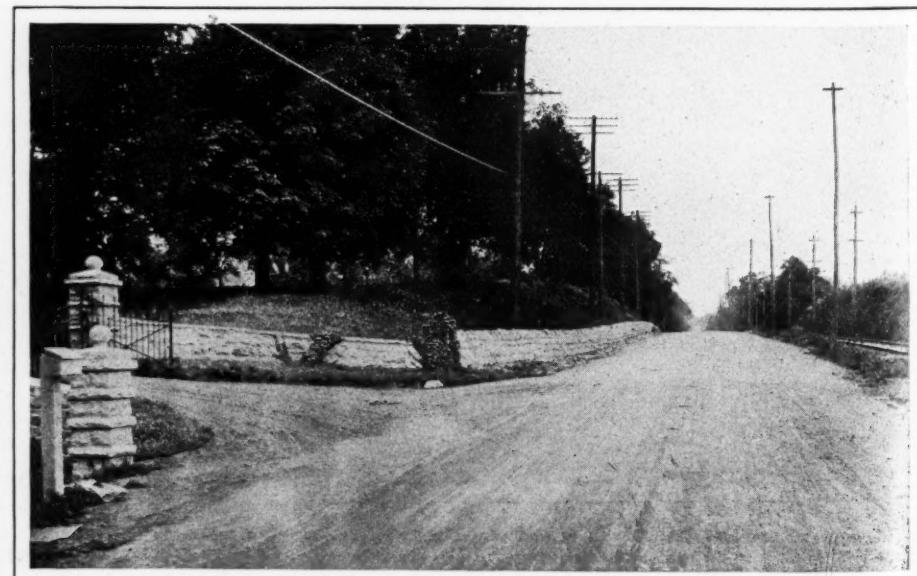
Among the relics of olden days that may be seen in the Historical society's museum is "Old Betsy," the musket of Daniel Boone, one of the chairs that was Presi-

dent Fillmore's, the pitcher that was used at the treaty of Hopewell and afterwards given to President Polk, the first \$5 greenback ever issued by the United States, and many interesting manuscripts and books of early date.

Nashville has no monument of more classic beauty than the Parthenon and as the ancient Parthenon of Athens was the greatest of all architectural monuments of classic Greece, so is its counterpart in Nashville pre-eminent among the beautiful buildings of the "Athens of the South." Situation, surroundings, atmosphere, motif, associations—all contributed to make it the feature of the great centennial held in Nashville in 1897, commemorating 100 years of the city's existence.

Educationally Nashville ranks high. Within its borders are Vanderbilt University, the George Peabody College, Fisk University for colored people, Belmont College for women and a number of other prominent schools of various kinds.

Nashville is one of the few American cities that can boast of having a real mummy within its confines. Just how the city came to possess a mummy is interesting. Jeremiah George Harris, the great antebellum editor of Tennessee, following his



View on Franklin road out of Nashville. Many miles of such highway lead into Nashville

editorial efforts in behalf of Jackson and Polk, was appointed to a post in the navy and in 1860 the man-of-war on which he was stationed was sent to Egyptian waters. While ashore one day with a member of the Khedive's staff, the latter was set upon by ruffians and were outclassed by Harris, who was a powerful man. The Egyptian made inquiry as to what he might do to repay Harris for saving his life.

"Give me a mummy," laughed Harris.

"A mummy?" repeated the Egyptian, pondering the question. "Do you know, sir, that our laws prohibit the removal of mummies under penalty of death? But, never mind, your wish shall be fulfilled. Just before your vessel leaves the harbor a small boat will come alongside. It will contain that for which you have asked."

It was so ordered. When the man-of-war prepared to depart a boat did come alongside and a package was put aboard. When opened in Boston after the boat returned to American waters it was found to contain six mummies, one of which is now in the museum at Nashville.

No story of this kind would be complete without mentioning the name of Captain William Driver, who gave the Stars and Stripes the name of "Old Glory." Driver was a sea rover and as he sailed from Salem, Mass., in 1831, for New Zealand, he christened the flag on his ship, "Old Glory." He brought the original "Old Glory" to Nashville with him and it waved over the capitol building following the occupation of Nashville by Federal troops in 1862. He lived in Nashville for nearly 50 years and his tombstone bears this epitaph:

"His Ship! His Country!
And His Flag, Old Glory!"

Nashville is one of the few cities ever thrown into the hands of a receiver. The receivership was sought not because of the corporation's financial disability, but because of mismanagement and extravagance on the part of the men in office—known to fame as the Alden ring. E. A. Alden was mayor and the regime was of the so-called carpet-bag variety, a type familiar during the reconstruction period following the Civil War. It was alleged that nearly a million dollars had been spent without vouchers. John M. Bass took charge as receiver and when his administration ended the citizens had the franchise restored to them and elected a government to their own liking.

We often hear of cities going to the dogs, but sel-



Caldwell lane, another example of Nashville and Davidson county roads



Remains of old coach used by Andrew Jackson for state occasions while president and in making several trips from Washington to Nashville. The wood in the coach was once a part of the ship Constitution

dom do we hear of a city being saved by dogs, yet such is the distinction of Nashville. In 1781 a band of Cherokee Indians attacked the then small settlement and it was only through loosing the dogs of the town, which had been trained to attack

Indians, that the settlement was able to overcome the superior numbers of the Cherokees.

The historical city of Nashville has much to interest the tourist. Its drives within the corporate limits are inviting, the roads

leading to it are such that one gets the ultimate of pleasure out of motoring over them. Its physical charms are captivating and its historical standing is such that it ranks high among the leading historical cities of our country. Such is the city, called the "dimple of the universe."



Confederate Soldiers' Home on road from Nashville to the Hermitage

From the Woman's Viewpoint

What Thanksgiving Was Without a Motor Car

THANKSGIVING Day was born in New England, and a century ago its acquaintance was still confined to that region. So the New England housewife, who had been preparing the turkey dinner each anniversary after the established fashion of her grandmothers and their grandmothers who knew Thanksgiving Day, decided something must be done to make Thanksgiving Day more popular. For she knew the benefit to be derived from his friendship, and she wanted everybody else to know it, being of a civic conscience as her Pilgrim fathers, the contemporaries of Thanksgiving Day's babyhood, were before her.

So each year she invited some of her distant relatives to help eat the turkey dinner that she prepared from all the resources at her command. It often worried her when she came to the invitations, but she persevered, and such were her dinners that nobody ever complained, but remembered Thanksgiving Day ever after.

Troubles of Letter Writing

Some of the relatives lived at a distance, and these had to be invited days in advance of the anniversary, for there was no postal system such as we know now and no speedy transportation. If she lived in Boston, as she did whenever she could, and the invitee lived in New York, a week was long enough for the letter to travel from place to place, but if the relative lived in Chicago, the letter would have to be sent the 4th of July to reach him or her in time for the journey.

And such a time as she did have writing that letter, too! Nearly every year she vowed she would not do it again, until finally she found she was getting into the same habit as the Christmas habit of vowing she would do it early, and she had humor—dry humor, of course, being a New Englander—to laugh at herself for it, and ever after it was not quite so bad. There was the process of writing the letter. She had no steel pens, no blotters, no ready-gummed envelopes, no postage stamps and no letter boxes, so, besides having a hard time getting it written, she had a hard time getting it mailed, such a hard time that it was harder even than her descendants have today getting their letters mailed.

Then she knew the recipient was in for this awfully hard time when the letter was received, for, of course, no one would think of refusing such an invitation if it were at all possible to accept. She often hesitated about inviting the poor relative for fear the turkey dinner might not turn out good enough to make up for the terrible hardships to be encountered.

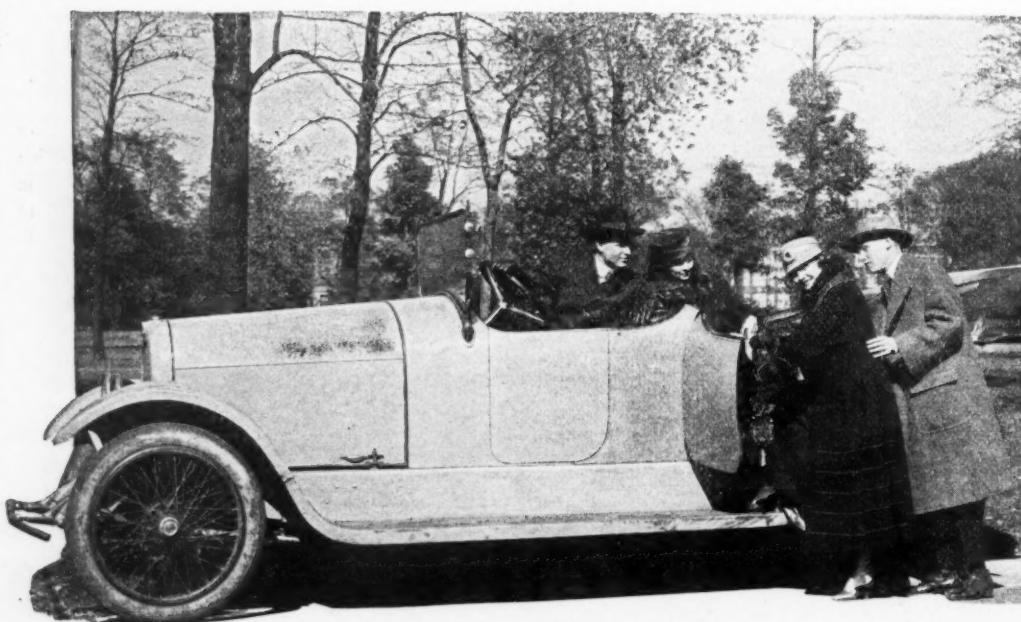
There were the roads. No highway knew anything at all about macadam, asphalt or steam rollers. In fact, practically every highway was just pretending to be one, anyway. Then, there was the transportation. The poor relative would have to travel just as Jacob and his family did. Even in the city travel was on foot or by horse or carriage. There were no street cars, no motor cars, or no anything else much. Besides, the poor relative was very

apt to catch his death of cold on such a perilous trip. And what would she do if he arrived half-frozen? He would just have to remain half-frozen, temporarily at least, for there was no steam heat, and the fireplace was temperamental. It nearly always refused to give out its heat liberally, and unless it had been fed well one side of the poor relative would have to stay out in the cold while the other warmed, and vice versa, on the installment plan.

Suppose the poor relative caught cold? There was no drug to give him, no quinine, no anything, except tumblers of obnoxious concoctions that took away all the appetite for the turkey dinner.

Just to realize what the New England housewife had to put up with, remember that Texas, Florida and California were as wild and woolly as some people think them today—that is, people who do not know them—and reflect on what would be your mental condition if you had had to wait 6 weeks, as the residents of these states did, to find out who was elected president, let alone to get a perfectly good invitation to a perfectly good turkey dinner.

There wouldn't be anything much to offer the poor relative when he had survived all these tribulations, anyway. She wouldn't have any tomatoes, for nobody would eat them and besides they were out of season. There was no range to cook on



The Pilgrims went to church Thanksgiving day on paths through the woods. They wore demure clothes and carried guns. The descendants of the Pilgrims use the motor car on stretches of macadam and other man-made paths. They wear novel clothes and carry color-splashed bags. At the right is perhaps our nearest approach to Pilgrim garb, and the hat is velvet and the coat is of reindeer leather. The clothes are from Mandel Bros., Chas. A. Stevens & Bros. and the Hub, Chicago. The car is by courtesy of the Marmon Chicago Co.



or kitchen stove of any kind. There were no matches, no refrigerators, no ice cream freezers—nobody knows what children did then—no egg beaters, no lemon squeezers, no double boilers for the custards and things and no anything else much. And as if it wasn't enough not to have tomatoes, there was no asparagus, no string beans, no corn, no peas, no canned goods at all.

It was a good thing, though, nobody expected her to do much entertaining and talking and things like that. There wouldn't be anything in the newspapers to talk about unless the folks discussed things that had happened 6 months ago, and as for the new plays, operas and social season—horror! She, of course, would spend her time in the kitchen, bossing things and keeping the pots boiling, deciding who would have to wait and just how much the table would stand.

Sports 1 hp. Only

If it cleared off snowing soon enough, and the drifts were not too deep, maybe old Dobbin could be hitched up to the bob-sled, and part of the dinner party could go out in that. And, if the snow didn't pack too much on the horse pond down in the hollow the younger folks could go skating, though some of them would have to wait until after Christmas and the good saint had done his duty with a pair of skates. Nearly all the children got their skates off the Christmas trees. The hardware, that is, general store, seemed to carry them only for display.

But, of course, the turkey dinner was to be the hub of the gay happenings. The pantry shelves fairly groaned beneath pumpkin pies and mince pies and plum puddings and the like. And the old open fireplace, where the turkey was turned and roasted clear outdid itself in sending smells through the house. The table nearly died beneath the weight of it all, and there was so much to eat the children who had to wait grew weak from hunger, so some of them had to go and sit on the stairs, just around the door, until the chairs began to scrape at the end of the ceremony.

Didn't take much entertaining for that crowd after they'd been fed. They were stuffed until they couldn't care whether tomorrow ever came. The poor relative enjoyed it especially. For, you know, New England practically had a monopoly on the old fellow, Thanksgiving Day, and nowhere else did the turkeys grow so fat as in that region.

So, the poor relative went away from the New England housewife's turkey dinner, with mind made up that Thanksgiving Day was a great person to know and that New England wasn't the only one that'd know him in the future.

And no sooner had the relatives taken up the custom of celebrating the anniversary than all sorts of things happened and kept on happening, breaking out in new spots from time to time, until just now

there's some talk that the relative in Chicago may fly over to New York just for a turkey dinner or have the New York relative come over for a few hours.

Why, tomatoes are quite the rage now, and asparagus and avocados and mangoes and oranges and beans and peas and all sorts of out-of-season edibles keep getting in the swim. Motor cars take you and your friends over to brothers and sisters and grandfolks houses galore.

Maybe it was just the other day you went to the telephone and said, "Jones' residence," and somebody answered back and said, "Say, this is Smith, won't you and your folks come over Thursday and help us get rid of the gobbler?" and you said, "Sure, what time do you want to eat?" And when Thursday comes the New England housewife forgets the established fashions of her grandmothers and their turkey dinners and puts on her heavy motor coat and tells the children to put on theirs, and the head of the house says he guesses old Mr. Turkey can live until Christmas now and goes out and sees to the gasoline. And they run over to the Smiths, 25 miles or so away, and eat turkey dinner and come back home and wait for next Thanksgiving Day anniversary.

Or maybe the New England housewife doesn't even see that Mr. Turkey is strutting in the coop, but says, "How about a dinner at Delmonico's and a good show after it?" and everybody being agreeable, they get in the motor car and run 10 miles or so across town or into the city.

Or Texas and Florida and California kinfolks may drop a wire that they'll be at her house, if all's agreeable, and it usually is when she knows ahead of time they're coming. And she meets them at the station in the car and takes them out home in no time, so they're not cold or anything they shouldn't be. And even if they did catch cold with heaters and all that the steam heat would thaw them out in no time and just think of the new-fangled drugs she could give them!

Beauty Hints for the Woman Motorist



No. 15

WINTER is a particularly hard season for the complexion. This added severity is due largely to the increase in the burning of coal, for there is nothing like coal to make a good complexion bad and a bad complexion worse. The pores, that breathe for the skin, like the lungs, that breathe for the body, take the small particles of carbon and dust in with every breath, and the result is undesirable, to say the least.

When the lungs take the carbon in they drive it to some corner, and gradually that part is given over to the carbon alone. The lungs do not halt in their work for this reason, as their capacity is, to a certain extent, elastic. The pores of the skin, however, have no reserve cohorts, and the clogging of the pores results in local irritation and unsightliness.

To suggest a simple remedy for this condition: Squibb's soft soap, which is similar to green soap in its effect and a soft, jelly-like substance in material, should be applied directly to the skin. A suds can be mixed in the palm and hand with a little of the jelly and water. A few minutes will permit the soap to dry; then it can be washed off. The use two or three times a week, if persisted in, will bring improvement in the complexion. The soap not only cleanses, but contracts the pores

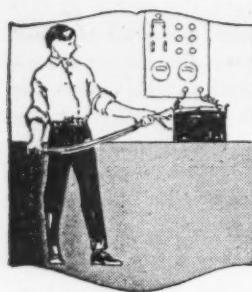
Spring Styles Foretold

Spring will see the present styles more pronounced, according to the style committee of the National Cloak, Suit and Skirt Manufacturers' Association, which met in Chicago recently. The motoring coat will range in length from a point just below the knee to one a few inches above the bottom of the skirt. The collar will be large and convertible, so that it can be buttoned at the neck or opened. This type of motoring coat will be loose, hanging in full gathers and belted by any of a variety of belts and partial belts.

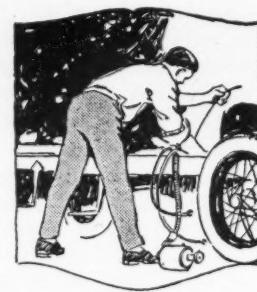
The full gathers will resemble those of the present season in their treatment, however. For the straight lines that already are beginning to characterize coats and skirts will be continued and emphasized slightly. The sport coat that proves so popular in summer motoring, especially, will vary in length from the finger tips to about the knee length.

Clothes as a whole promise a reaction against the elaborate trimming in vogue for the last few years. The new styles will be different and simpler. The tailored suits will be new in cut, but will conform to the straight line tendency of the 1917 silhouette. The English outing costume will furnish the model for straight line suits made with plaits and gatherings held at the waistline by belts, partial belts and sashes.

The sports suit, so popular with motorists, will be in even more demand, and the colors, by some thought bright enough even now, will have a wider variety in brightness and cheer. The jackets will vary from wrist length to finger tips. Skirts will be longer with less fullness than heretofore. Everything points toward brighter and more cheerful effects. Beiges, tans, rookie, heather, grays and blues will be favored, and they probably will be lightened by odd combinations with other colors.



Electrical Equipment of the Motor Car



By David Penn Moreton & Darwin S. Hatch.

Editor's Note—Herewith is presented the twenty-third installment of a weekly series of articles which began in Motor Age issue of June 29, designed to give the motorist the knowledge necessary to enable him to care for and repair any and all of the electrical features of his car, no matter what make or model it may be. At the conclusion of this series, "Electrical Equipment of the Motor Car," with additions, will be published in book form by the Class Journal Co., Chicago, in a size to fit the pocket conveniently. It is expected that the book will be published about May 1.

Part XXIII—Electromagnetic Regulation

VARYING the Value of the Field Resistance by a Solenoid: The Adlake equipment has a regulator which consists of a resistance whose value is controlled by the magnetic action of a solenoid. The device, in brief, consists of an arm pivoted at one end and equipped with a carbon brush on the other end. This carbon brush moves over a number of metal segments arranged in the form of an arc of a circle and connected together by a small coil of resistance wire. The field circuit of the generator has one terminal connected to the arm and another connected to one end of the series of segments. The position of the carbon brush on the segments will determine the portion of the total resistance connected in series with the field winding. For example, when the carbon brush is on the segment to which the field winding is connected, no part of the resistance will be in series with the field; on the other hand, if the carbon brush is on the segment farthest removed from the one to which the field winding is connected, all the resistance will be in series with the field winding. The normal position of the arm corresponds to the one in which there is no part of the resistance in series with the field winding. The position of the rheostat arm is determined by the combined magnetic action of the current in the winding of the solenoid about the iron core marked T, Fig. 153, and the weight of the plunger R, the core and plunger being attached to the opposite ends of a short cable which passes over a grooved wheel attached to the rheostat arm. The weight of the plunger R may be increased by adding more shot and decreased by removing some of the shot. Increasing the weight of the plunger R will increase the current required to produce a given movement of the rheostat arm.

Effect of Generator Output

The entire output of the generator passes through the winding of the solenoid, and as this current output tends to exceed the value for which the adjustment has been made the iron core marked T will be drawn into the solenoid, causing the carbon brush on the end of the rheostat arm to move down over the segments. The value of the resistance in the field circuit will be increased, causing a decrease in the value of the field current and, hence, a decrease in the electrical pressure in the armature of the generator.

A wiring diagram of the Adlake-Newbold combined regulator and cutout is shown in Fig. 153. The complete device, with cover removed, is shown in Fig. 154. The generator is of the shunt-wound type and the field circuit may be traced as follows: Starting with the generator terminal marked +D, go to the corresponding terminal on the controller marked +D; thence to the fuse clip marked 6; thence to the terminal of the rheostat marked 3; thence through the resistance coils to the carbon brush on the end of the rheostat arm; thence to the screw 19; thence through the flexible connection to the screw 18; thence to the fuse clip marked 2; thence

through the fuse 5 to the clip 1; thence to the terminal +F on the regulator; thence to the corresponding terminal on the generator marked +F; thence through the shunt field winding to the terminal of the generator -D; thence through the armature winding to the starting point +D.

A second circuit exists between the terminals +D and -D of the generator, even though the contacts of the cutout be open. It may be traced as follows: Starting with the terminal +D;

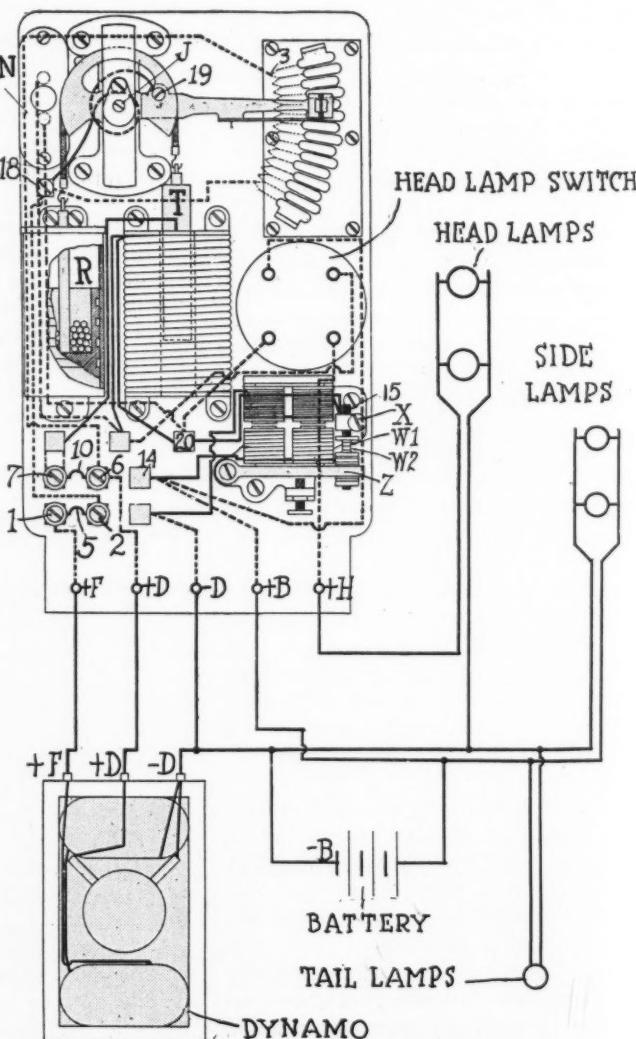


Fig. 153—A solenoid controls the value of the field resistance in this Adlake-Newbold regulator and cutout

thence to the fuse clip 6; thence through the fuse 10 to clip 7; thence through a winding on the solenoid to the connecting terminal 20; thence to the point X on the stationary contact of the cutout; thence through the windings of the two upper electromagnets in series to the connecting terminal 15, and then to the terminal -D on the generator.

As the voltage of the generator builds up, the current in the circuit just traced through increases, and when the magnetic pull produced by the current in the two upper electromagnets is sufficient to draw up the two lower electromagnets, which are mounted on the piece of iron Z, the cutout contacts at W1 and W2 will be closed. The closing of the cutout contacts will complete a new circuit, which may be traced as follows: Starting with the generator terminal +D; thence through fuse 10; thence through a winding on the solenoid to the connecting terminal 20; thence to the point X and to the upper, or stationary, cutout contact W1; thence to the lower cutout contact W2; thence through the windings of the two lower electromagnets in series to the connecting terminal 14; thence to the controller terminal +B; thence to the positive terminal of the battery marked +B through the battery to the terminal -B; thence to the negative terminal of the generator, and thence to the terminal +D, or starting point.

Effect of Lamps on Output

In tracing this last circuit, the lamps were assumed to be turned off. The current in the two lower electromagnets assists in holding the cutout contacts closed as long as the battery is charging, but should the battery start to discharge the magnetic action will be opposite that produced by the upper electromagnets and the cutout contacts will open. The front lamps take their current through a special switch, whose connections are such that the resultant magnetic action of the generator current in the solenoid is less with the front lamps on than without them. Hence the current output of the generator is increased when these lamps are turned on. The switch in the upper left-hand corner, marked N in Fig. 153, is for getting the night rate of current output from the generator continuously should conditions demand it.

Solenoid and Mercury Well Control of Field Resistance: A number of the earlier Deleo systems were equipped with a regulator known as the mercury well type. A cross-section of one is shown in Fig. 155. This regulator consists of a winding, A, which surrounds the upper end of a mercury tube, B. Inside this mercury tube is a plunger tube, C, with a winding of resistance wire, R, about its lower end. One end of the winding R is attached to the cover end of the plunger tube and the other end is connected to the needle, N, carried in the center of the lower end of the tube. The lower portion of the mercury tube is divided by an insulating tube into two concentric compartments, the plunger tube being partly immersed in the outer compartment and the lower end of the needle N in the inner compartment. The space in the mercury tube above the mercury is filled with a special kind of oil, which serves the double purpose of protecting the mercury from oxidation and of lubricating the plunger tube. The whole device is supported by a bracket, D.

The terminals of the winding A are connected to the two wires leading from the generator brushes, and as the voltage of the generator increases the current in the winding increases. Hence,

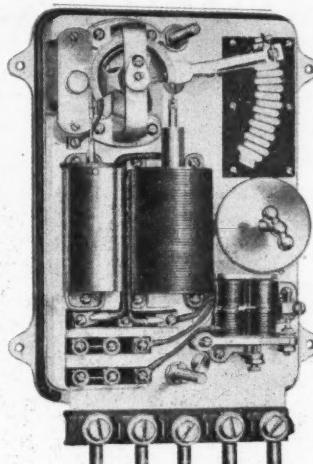


Fig. 154—This shows the Adlake-Neubold device with the cover removed. The generator is a shunt-wound type

there is an increase in the magnetic pull on the iron plunger tube C. As the lower end of the plunger tube is withdrawn from the mercury, due to the magnetic pull of the winding A, more resistance is inserted in series with the shunt field winding of the generator, as the field current must now pass through a greater length of the wire in the winding R in passing from the needle N to the mercury in the outside mercury well. With this increase in resistance in the field winding there is a smaller field current for a given terminal voltage. Hence, the terminal voltage of the generator does not increase as rapidly as it would if no resistance were inserted in series with the field winding. As the charging of the battery continues the voltage of the system increases, and the magnetic pull produced by the winding A increases, causing more resistance to be inserted in the field circuit and thus preventing an excessive charging current while the battery is approaching a condition of complete discharge. With a decrease in speed of the generator, there will be a decrease in the generated voltage, thus causing a decrease in the magnetic pull produced by the current in the winding A and, hence, a decrease in the resistance of the field circuit, which prevents the voltage decreasing as rapidly as it would otherwise.

A variable resistance, E, is connected in the supporting bracket D and connected in series with the winding A. The value of the portion of this resistance in series with A may be adjusted at any time by a lever, F. The object of this adjustment is to take care of the variations in the battery voltage, due to changes in temperature.

An Electromagnet Used in Controlling the Connections of the Field Circuits: In some of the older types of Deleo equipment an electromagnet was used to change the connections of the field windings and to regulate the output of the generator as follows: The field of the generator is produced by permanent magnets which are provided with several shunt field windings. The connections of these shunt field windings are controlled by the electromagnet, whose magnet action is governed by the output of the generator. At low engine speeds the shunt fields are connected so that they assist the permanent magnets in producing a magnetic field for the armature to revolve in. With an increase in voltage of the generator, due to an increase in speed, the field windings are disconnected, the permanent magnets act alone to produce the magnetic field and the increase in voltage is not as great as it would be had the shunt field windings remained connected. With a still further increase in voltage the shunt field windings are again connected with a resistance in series, but in such a manner that the current in them produces a magnetic effect opposite to that produced by the permanent magnets and the field strength is reduced, which counteracts to a certain extent the increase in speed. The resistance in series with the field winding is removed by a change in connections when the voltage reaches a value produced by the highest engine speeds and the maximum magnetizing action of the shunt fields oppose the permanent magnets.

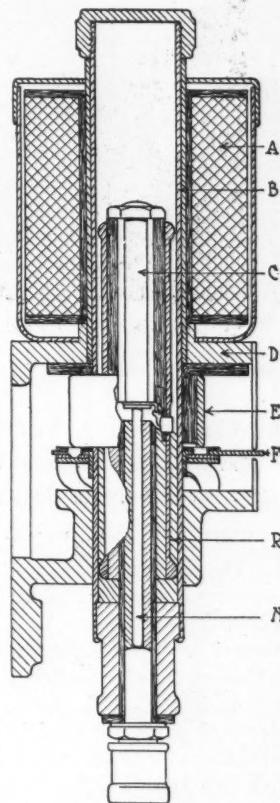


Fig. 155—A cross-section of the mercury well regulator. Some of the earlier Delco systems used this type

NEXT WEEK

The next installment of the series on Electrical Equipment of the Motor Car will consider mechanical regulation.

The Readers' Clearing House

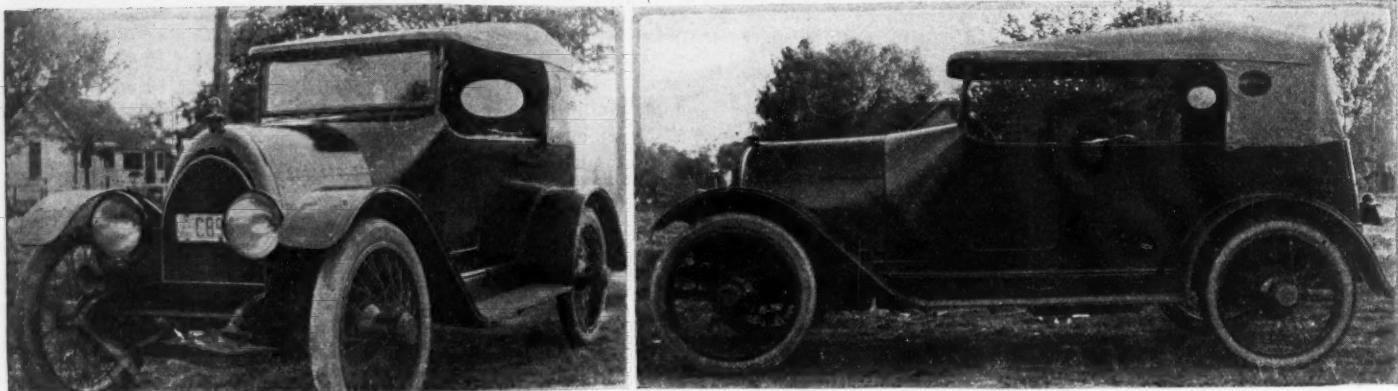


Fig. 1—Home-made body on Chalmers. The radiator is a Fiat type

Constructional Features of Racing Cars

CHALMERS TO A FOUR-PASSENGER
Reader Sends Photographs of Car He Has
Rebuilt in Own Shop

LEMOORE, Cal.—Editor Motor Age—The illustration, Fig. 1, shows a rebuilt Chalmers model M 30 which has attracted considerable attention here, and may be of interest to Motor Age readers.

The work of rebuilding was all done in our shop and nearly all by me. Standard parts are used in the chassis except the rear axle, which is arranged to give two speeds. The body is a four-passenger close coupled, with one door on each side. The radiator is a honeycomb built after the Fiat type. Dunlop wire wheels are fitted, with the spare wheel in a compartment in the rear.

With a gear ratio of 2.94 to 1 the car has made 60 miles per hour on level roads. I have driven it over 6,000 miles and am very well pleased with the job.—H. L. Burkhardt.

GROUND SURFACES FOR GASKETS
Flexible Insertion Between Head and Cylinder Takes Up Warp

MERIDEN, Kans.—Editor Motor Age—Where can one obtain instruction books on making patterns for motor car engines?

2—What are the different ratios between engine and propeller shaft of the standard three and four-speed gearsets?

3—Would grinding the cylinders and cylinder head of an engine, similar to a Ford, make gas-tight fits without a gasket?

4—What is Motor Age's opinion of a transmission service brake?—F. C. H. Newton.

1—To the best of our knowledge there is no such book published.

2—The ratios differ in different makes. On three-speed gearsets, direct is on high. On practically all four-speed gearsets, direct is on fourth. In three-speed gearsets, the intermediate is reduced around 1.7 to 2 to 1; in low, around 2.5 to 3.5 to 1. On four-speed gearsets, low is generally around 4 to 1, second, around 2 to 1 and

third, around 1.5 to 1, fourth, being direct.

3—Yes, if the grinding was done accurately enough. Gaskets are as satisfactory with much less machining cost. Furthermore, in replacing the head after once having removed it, great care would have to be taken to be sure that the surfaces were clean. The gaskets also serve well to take up any warping which may occur in the metal.

4—As a general proposition such a brake is considered very efficient. In designing the parts of the cars, when a transmission brake is to be used, the extra strain that this imposes must, of course, be taken into consideration.

INFORMATION ON RACING CARS

Illustrations and Descriptions of Packard and Mercedes Valve Arrangement

TIFFIN, O.—Editor Motor Age—Give a diagram and instructions for adjusting a model G Rayfield carburetor.

2—Give a diagram and explanation of the valve and spark plug arrangement on de Palma's Mercedes; on the new Packard; Tom Alley Special.

3—Do they use three or four forward speeds?

4—What is the gear ratio in the highest speed of each?

5—Which is more popular in racing cars, a unit or separate power plant? Name some cars using each.

6—How many camshafts are used in the Packard, and Tom Alley Special racing cars?

7—Which is the more popular in racing cars, hollow or solid connecting rods or camshafts?

8—Would aluminum connecting rods, camshafts, frame and front axle be as strong as steel of the same size? If not, would they stand the strain of racing?

9—Give the advantages and disadvantages of right and left-hand drive on racing cars.—F. A. Work.

1—The adjustments of the model G Rayfield carburetor are pointed out in Fig. 6. The adjustments shown are the only ones on this carburetor. Get the motor running properly at low speed by manipulating the low-speed adjustment. Then speed the motor up and make the high speed adjustment.

2—The Mercedes and Packard valve arrangements are pictured in Fig. 2 and 3. The valves in both motors are driven from a vertical shaft operating the overhead camshaft, as shown clearly in the illustrations. The plugs are located in the sides of the cylinders. We have no data on the Tom Alley special. The Packard valves are

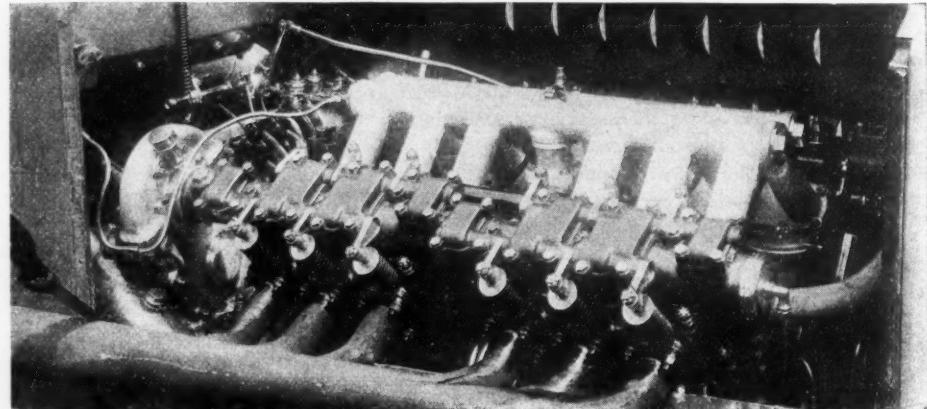


Fig. 2—Showing valve arrangement of Packard aviation motor. The valves are operated by overhead rockers

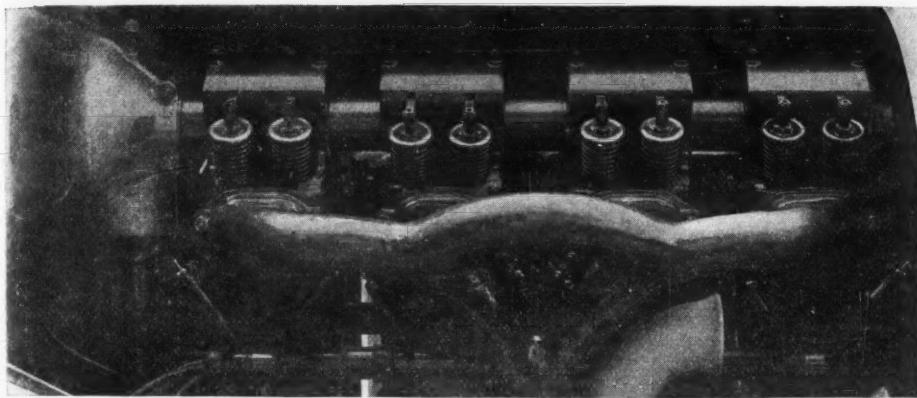


Fig. 3—Valve arrangement of de Palma's Mercedes. The plugs may be seen on the side of the cylinders

operated by cranking the rockers. The lever which rests on the cam and the lever which touches the valve are at opposite ends of a short shaft. This means that the bearing of the rocker comes between the cam end, which is in an oil box, and the valve end which is outside. The length of the bearing provides a perfect oil seal so that the cam mechanism can be lubricated abundantly and yet the valves will remain perfectly clean.

3—Three speeds forward.

4—Mercedes 3.1 to 1. Packard not given.

5—Separate construction is used universally. We know of no racing cars of any prominence using the unit construction.

6—The Packard has two camshafts, one over each block of cylinders.

REMEMBER!

Water

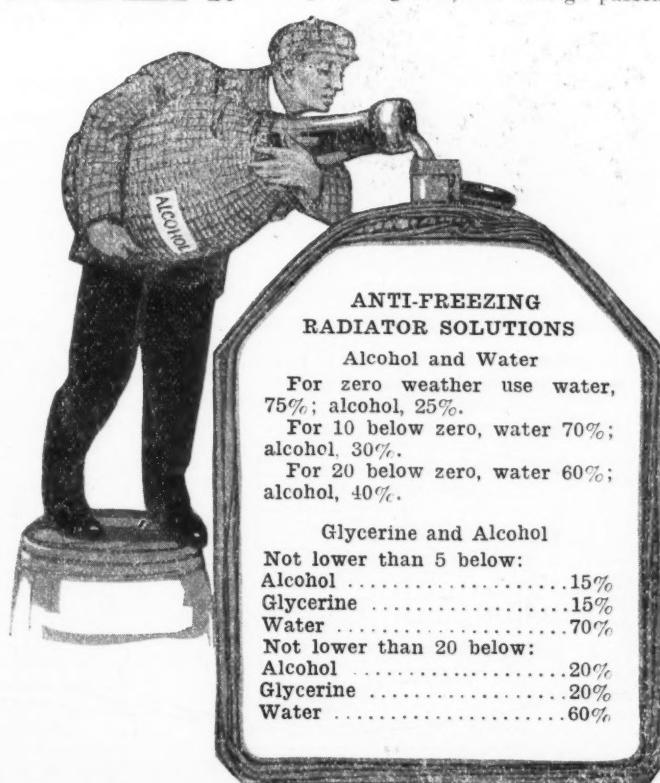
Freezes

at 32

Degrees

Above

Zero



cars, are right-hand drive. The driver sits on the left on most American built cars. Foreign cars have won most of this year's speedway records, while the Packard aviation-motored racer, with right-hand drive, has shown the greatest speed of them all. The Duesenbergs, which have made very creditable showings this year, are left-hand drive.

RUNNING CAR WITH BATTERY OUT

No Proper Installation Can Be Made to Protect Generator Windings

Laurel, Miss.—Editor Motor Age—Is there any electric system which can be run with the battery off without disconnecting the generator? If so, how can it be done?

2—Is the armature revolving within the fields collecting current with the brushes raised?

3—I have been told that this could be done but could not figure out how it could be done without damage to the generator. Some say connect the generator terminal. This looks like a direct short with the current building up to such a height. Something must give with nothing to consume it.—J. O. Winston.

A great many systems may be run with the battery off and current taken from the generator, but in none of them is it a safe proposition. The battery takes care of the generator current as it is intended, and without this outlet for current it is very likely that the generator will suffer.

2—No. There will be no current generated.

3—Connecting the generator terminals will build up the current excessively and possibly burn out the windings.

Electromagnet Dimensions

Zanesville, O.—Editor Motor Age—In the April 13 issue of Motor Age the making of a magneto charger is described. You state that the coils should be made about 4 inches in diameter and placed on a wooden base about $\frac{1}{2}$ inch apart. This will bring the cores $4\frac{1}{2}$ inches apart, center to center, and most magnets are 3 to $3\frac{1}{2}$ inches from one pole to the other. Will you explain this?—W. F. Herron.

There are a number of sizes and shapes in magnet chargers which will perform the work for which they are intended. The charger described, although different in size than the ones which you may be familiar with, is a good type. You will find a description of a simpler charger on page 44 in this issue.

Cloverleaf for Chevrolet

Madison, Wis.—Editor Motor Age—Where could I obtain a Cloverleaf, four-passenger body for a 1915 Chevrolet Royal Mail roadster? Would it be necessary to have this made to order?—M. R. Kindschi.

Chevrolet has never put out a cloverleaf body for any of its models and, to our knowledge, there is nothing marketed to fit this car. A special body would be necessary. You might get in touch with any of the following, all located in New York City, Brewster Body Co., Holbrook Body Co., Silver Body Co., Fisher Body Co.

Wiring Duct for Ammeter

Rupert, Idaho.—Editor Motor Age—Publish a diagram showing how an ammeter, one that will show the charge and discharge and a dash light, may be connected to a Darron car.—F. B. Darrow.

A wiring diagram of the Darron car is shown in Fig. 4. You will note that the dash-light installation calls for another fuse, as this system of wiring utilizes fuses

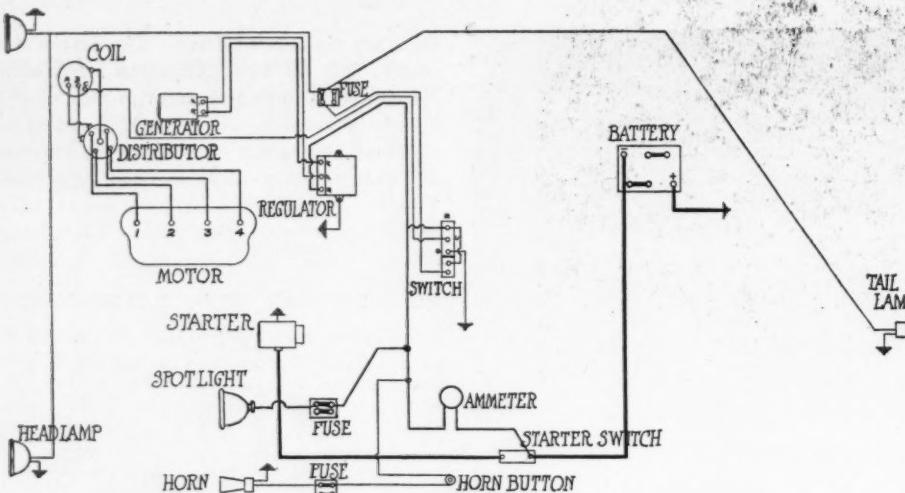


Fig. 4—Wiring diagram of Dort car, suggesting connections for spot light and ammeter

between each accessory and the battery. The ammeter is inserted in the wiring line shown. It is necessary to cut the wire and run leads to the ammeter from each of the cut ends. If, after the installation is made, the ammeter shows discharge when it should show charge or vice versa, switch the wires on the ammeter and the fault will be corrected.

BODY REMODELLING OF MICHIGAN Reconstruction of Rear End to Permit Carrying Four Passengers

Indiana, Pa.—Editor Motor Age—I have a 1912 Michigan 40 which I would like to rebuild into a speedster to carry two adults and two children. Kindly publish a diagram showing same.

2—Does it add greatly to the power to use non-leaking piston rings?

3—Will floating mica add to the compression and smooth the cylinders, and give the motor a smoother running sound if used with the oil in the crankcase?—O. D. Carlton.

1—The illustration in Fig. 7 shows how a 1912 Michigan 40 body could be constructed, the same cowl and hood as is now on the car to be used, to accommodate four people. If you desired to have a full streamline body the lines of the hood could be made to conform with those of the body, as shown by the dotted lines. The rebuilding would probably necessitate the addition of the body work behind the front seat, including the rear seat and rear deck. A good carriage maker should be able to handle such a job as this at a price well within reason.

2—If properly installed non-leaking rings add materially to the power by increasing the compression and to some extent minimizing the carbon deposit.

3—Graphite added to the oil is said to create a deposit of lubricant on the wearing parts which adds to the compression and smooths the cylinders somewhat, providing they be rough. It is a question to what extent this is true.

ADJUSTING STROMBERG MODEL K Only One Change on This Instrument, as Shown in Figure

Parsons, Kans.—Editor Motor Age—Give some information regarding the adjustment of the Model K Stromberg carburetor.

I have a Model 37 Allen car and am having trouble with the engine. It does not have

the power it should have. It does not pick up quick when the throttle is open and seems to miss when idling but when it is pulling in low it does not miss. The compression seems to be good, and I do not believe there is much carbon in the cylinders, and there is no back firing. I am under the impression that the trouble is in the adjustment of the carburetor.—E. E. Heafs.

The adjustment on this carburetor is very simple. Refer to Fig. 5. To make the adjustment run the motor with both spark and throttle retarded and turn the nut A up or down until the motor idles properly. There is no other adjustment. The correct high speed mixture is furnished automatically. Are you sure the carburetor is receiving a sufficient quantity of warm air, that the air connections are not loose or possibly removed? Stromberg does not guarantee satisfactory operation of this carburetor unless it is supplied with a sufficient quantity of warm air and installed with steering post or dash control.

AMMETER CONNECTION—CADILLAC Insert Leads Into Red and Green Wires From Generator

Portersville, Pa.—Editor Motor Age—Explain and show by illustration how to connect an ammeter on a 1914 Cadillac touring car, using the Delco system. I want to mount the ammeter on the instrument board.—J. R. Humphrey.

Refer to Fig. 10. This shows the manner which Cadillac recommends for attaching an ammeter to this model. You will note that it is connected with the right-hand terminal of the automatic cutout and with the No. 3 wire on the generator, which is the red negative to the battery.

To install the ammeter it is merely necessary to connect two wires onto the lines above mentioned, at the point nearest the cowl and string up the instrument. If, after the installation is completed, the ammeter shows charge when it should show discharge, or vice versa, the fault may be corrected by switching the wires on the ammeter.

CURRENT FLOW IN CHALMERS 6-30 Inexperienced Owner Should Not Attempt to Regulate Generator Controller

Denver, Colo.—Editor Motor Age—Publish a diagram of the wiring of the Chalmers 6-30-3,400 1916, from the generator through the regulator and from the battery through the regulator. Sketch the same so one can trace the flow of current in either circuit.

Give successive steps for putting the regulator in perfect adjustment.—J. P. Hancock.

The wiring diagram requested is published in Fig. 8 with the current direction in each wire indicated by the small arrows.

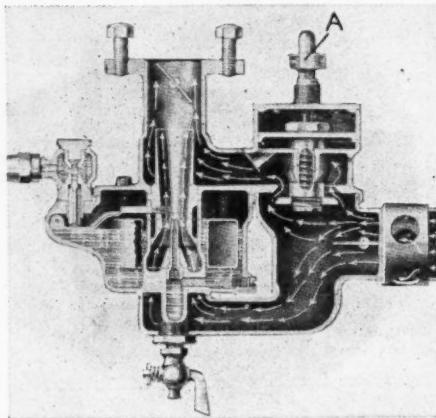


Fig. 5—Pointing out the one adjustment which regulates the Stromberg model K carburetor

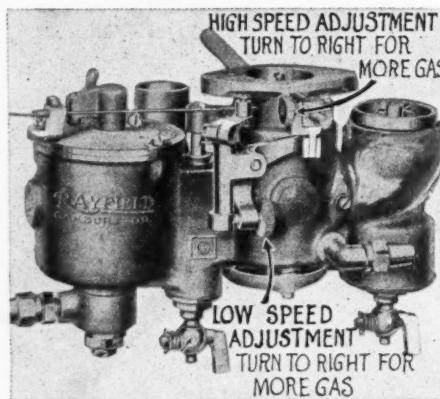


Fig. 6—This Rayfield carburetor has two adjustments, one for low speed and one for high speed

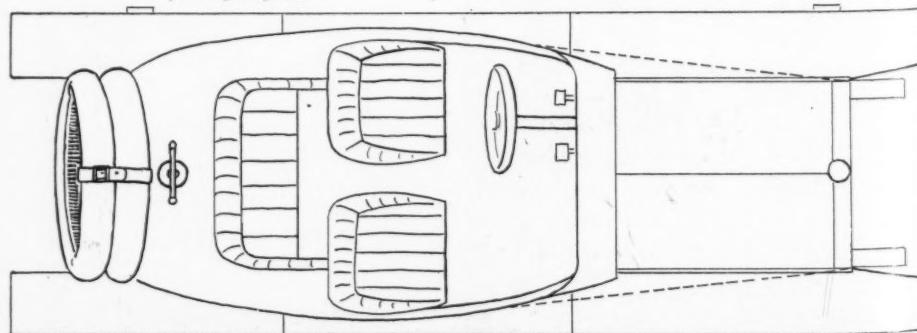


Fig. 7—Suggested body construction to convert Michigan 40 into four-passenger car for two children and two adults

The controller of the Gray & Davis dynamo is sealed at the factory, and if this seal is broken the guarantee is void. This is significant that the device should not be tampered with by one who is inexpert, and the controller should be sent back to the maker for proper adjustment.

However, if the seal is broken, the cover of the controller can be removed. It will be seen to consist of an electromagnet standing vertically. On top of this electromagnet is a clip which carries a coil of resistance wire. Looking down on top of the controller mechanism, and with the resistance coil toward you, the cut-out mechanism is at the left and the regulator mechanism at the right. The stationary cut-out contact is mounted on the end of the bar running across the top of the electromagnet coil. The movable contact of this cut-out is mounted at the upper end of a bar and is fastened to a stationary loop at the lower end, and to an adjusting screw at the upper end. The cut-out adjusting screw is held in place by two lock nuts. With these screws loosened the spring tension may be changed. Turning the adjusting screw in a right-hand direction, or down, lessens the spring tension and allows the cut-out to close at lower engine speeds. Turning the screw the opposite direction will increase the tension of the spring and the cut-out contacts will then close at higher engine speeds. After the cut-out is adjusted the lock nuts should be turned up tight. The cut-out should be adjusted to close at about 8 m. p. h. car speed.

HOW TO TAKE OUT FENDER DENTS May Be Straightened by Pounding Out With Formed Blocks and Hammer

Chicago.—Editor Motor Age—I have an Overland Model 83 T which has been driven 2,300 miles. When I have the engine idling and put it in high speed it does not miss, but as soon as the car is driven on the road it misses. I have cleaned the spark plugs and cannot locate which one is missing. There seems to be a good spark. The carburetor has been adjusted and the priming valve on each cylinder opened. When the priming valve is opened there seems to be more speed.

Also give some information regarding taking dents out of fenders.—F. J. Boerner.

You are presenting a description of a trouble which it is impossible to answer accurately by correspondence. A miss in a motor may be due to a great number of things and a good mechanic put on the job is about the only way of getting at the trouble. If the motor speeds up with the priming valves partially opened it would lead one to believe that the gasoline mix-

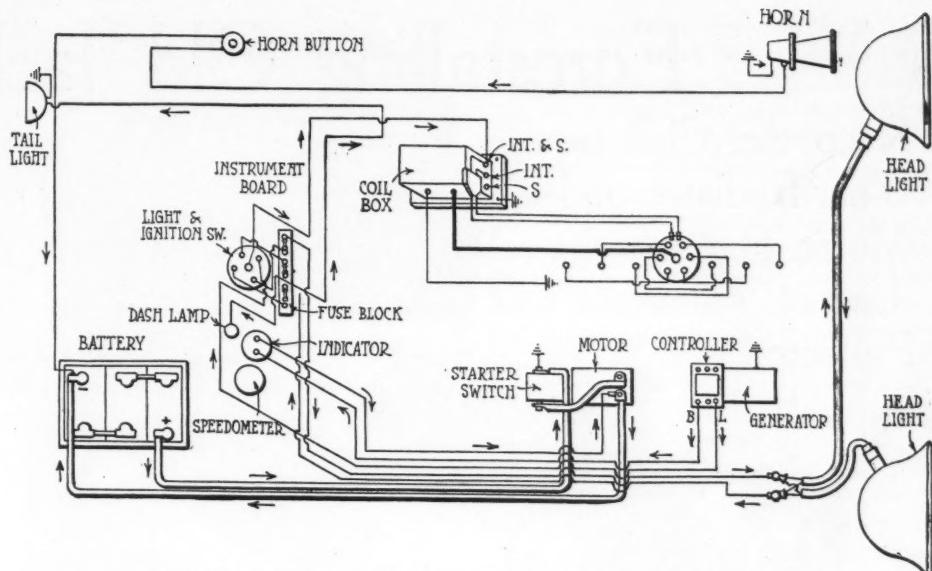


Fig. 8—Gray & Davis wiring on Chalmers with arrows showing the direction of flow of the current

ture does not contain enough air. An auxiliary air plug inserted in the manifold might make up the difference. Possibly the valves are loose and need taking up.

To take dents out of fenders the fenders must be removed from the car. Shape

poles of a storage battery which have no marking on them.—Alex McLeod.

The easiest method to determine the poles of a battery when it is very nearly run down is to connect short wires to each of the terminals and dip the ends of these wires into sulphuric acid. The negative terminal will cause the acid to bubble.



Fig. 9—Easy method of removing dents from fenders with the use of a shaped wood block

one side of a block of wood to conform as closely as possible with the curve of the fender. As shown in Fig. 9 the fender should be laid on a bench and the dents pounded out with the block of wood and a mallet or hammer.

Testing for Battery Poles

Moline, Ill.—Editor Motor Age—Give a method of finding the positive and negative

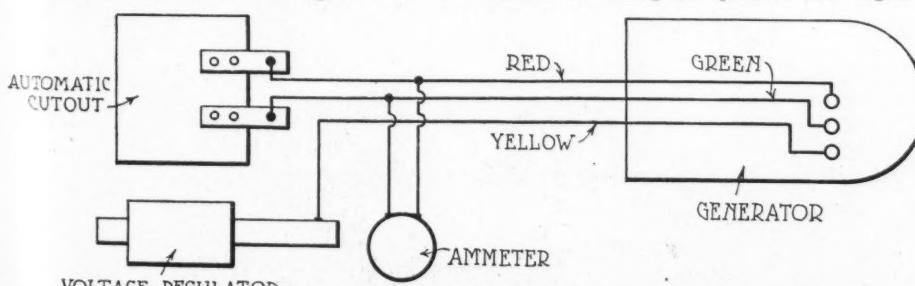


Fig. 10—Suggested method of attaching ammeter to 1914 Cadillac. The connection is made to the red and green wires from the generator

Buick and Overland Figures

Milwaukee, Wis.—Editor Motor Age—Kindly give the N. A. C. C. rating with brake horsepower for the Overland motor, selling at \$625, and the Buick selling at \$650.—A. V. Blacklock.

Overland does not market a car selling at \$625. The car to which you probably refer is that selling for \$635, the model 75-B. The N. A. C. C. h. p. rating is 18.21. The brake h. p., as advertised, is 31½. The Buick has a model D-4-34 roadster which lists at \$650. It has an N. A. C. C. rating of 18.2 h. p., and is said to develop 35 h. p. on brake tests.

Axle Slope Gives Hard Steering

Princeton, N. J.—Editor Motor Age—In one of the recent issues of Motor Age, a writer stated that the slope of the front axle greatly changed the steering of the car. I have a small car of foreign design which steers very hard. The axle is sloped so that the bottom of the king bolt is behind the top. If I placed wedges under the springs so as to make the axle slope the other way, would it tend to make steering less difficult?

In turning a corner the wheels do not tend to come back into normal position, but try to go as much off straight as possible. The wheels are lined up so that this is not the trouble.—W. W. Mevis.

Possibly your hard steering is entirely due to the slope of the axle. Wedging it straight, as you suggest, might remedy the trouble. In some designs the axle is sloped to facilitate steering. Are the wheels properly aligned?

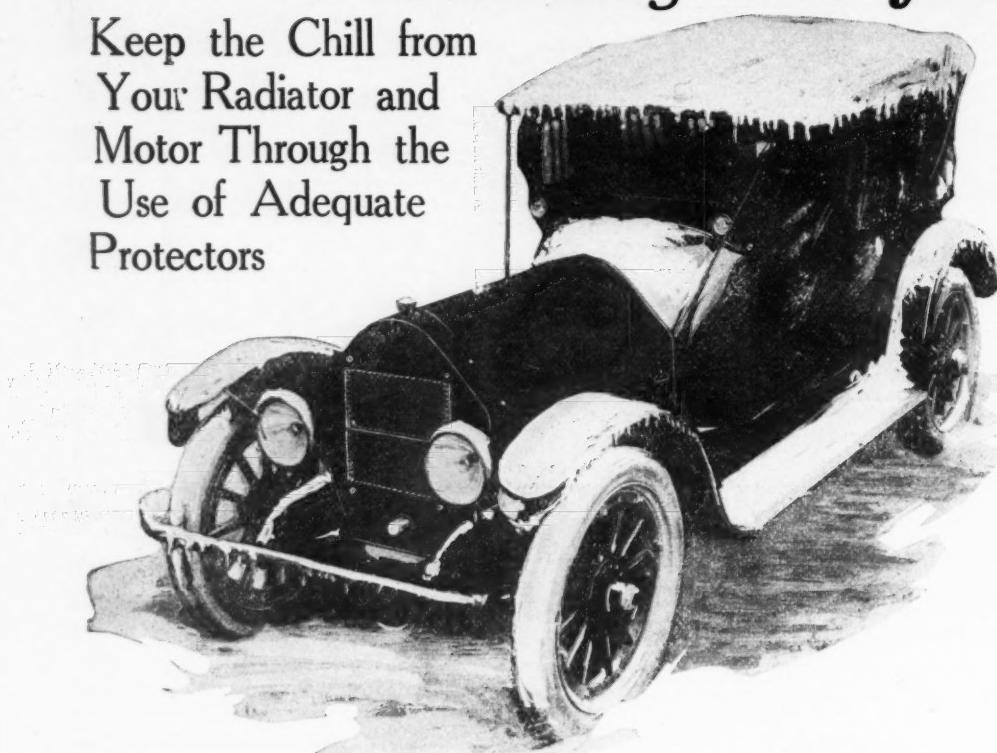
Weight of Studebaker Motor

Manett, Mo.—Editor Motor Age—What is the weight of the motor in the 1913 Studebaker model E, right drive six?—John B. Fenolio.

The weight of the motor when boxed is 750 pounds.

Forestalling Old Jack Frost

Keep the Chill from Your Radiator and Motor Through the Use of Adequate Protectors



It is imperative that you protect your radiator and motor. This is how it is done by the Gordon cover

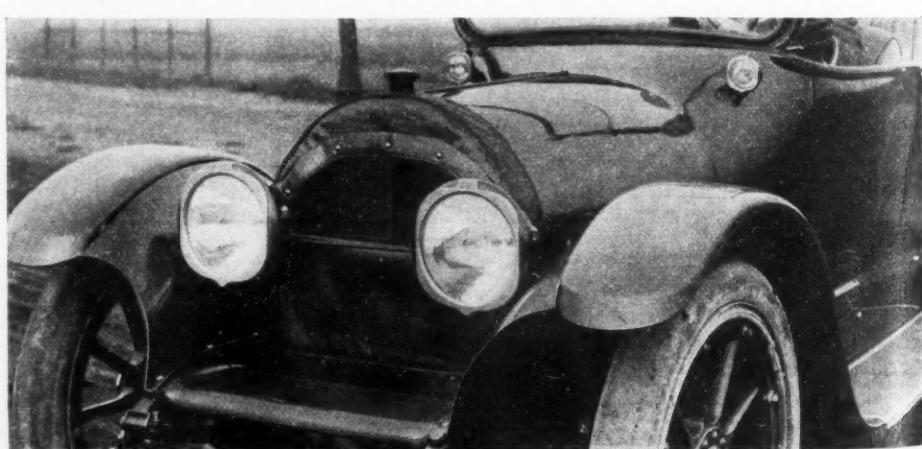
By William K. Gibbs

PROTECTION of the motor and radiator from sudden changes in temperature is imperative. Retaining the heat under the hood after the motor has been stopped and the car is to stand for any length of time is essential as in that way the oil is kept free from stiffness. Of course, those who drive in cold climates know the value of alcohol as a frost eliminator from the radiator, but even this does not prevent it from becoming cold and the oil from stiffening. Now that self starters are so much in use one should not forget that just because he does not have to get out in front and take some vigorous exercise at the crank that keeping the engine and radiator warm as long as possible when the car is standing still is quite essential. Just in proportion to the muscle straining of cranking put on the person who has no self starter on his car is the additional strain put on the starter and especially the storage battery when the motor is cold. Radiator and hood covers are quite as necessary to pleasant winter motoring as winter tops and car heaters. Covers are made to fit every make of car and most of those making these winter requisites are listed herewith and their product explained and the prices given. A few car manufacturers, among them being Packard, make hood and radiator covers for their cars, but in general most of the motoring public gets these covers from companies who specialize in cover production or through accessory houses.

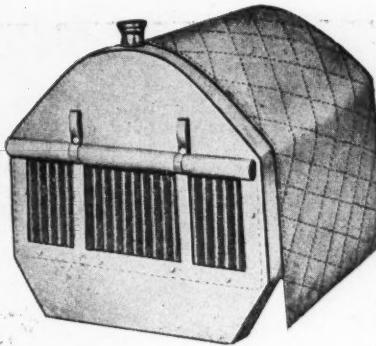
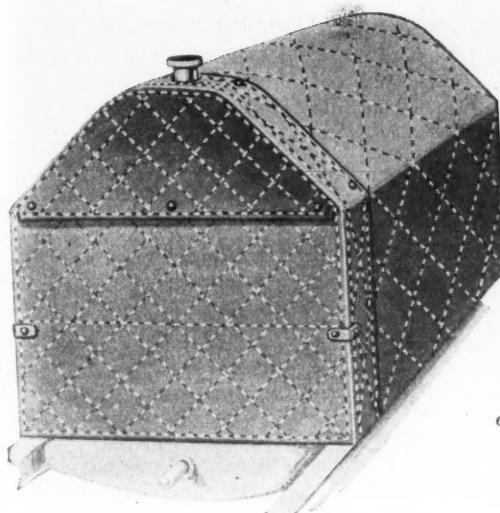
GORDON—Form-fitting radiator and hood covers is a slogan of the J. P. Gordon Co., Columbus, O. These covers are quickly and easily removed by means of special fasteners which hold securely. The covers are made in two pieces—a robe for the engine and an adjustable curtain for the radiator. The engine may be inspected without removing the robe and the radiator cover may be opened as much or as little as desired. Two grades of materials are used in the Gordon covers. One is a good grade of black finish enameled duck and the other an imitation leather which is guaranteed not to crack or peel. Both are wind- and water-proof and are lined with a good quality of heavy felt. Patterns are carried for every American car model from

which the covers are made and guaranteed to fit and give satisfaction. As a rule orders are shipped the same day they are received and none is held to exceed 3 days. Prices range from \$2.50 for radiator covers only to \$11.50 for complete combinations.

Wisconsin—The Wisconsin Auto Top Co., Racine, Wis., makes radiator and hood covers for all makes of cars, both passenger and commercial, and it backs its product up with a guarantee that the covers are a perfect fit for all cars for which they are designed. Two qualities of material are used, but the same pattern is employed throughout the line. These covers are made so that the part covering the hood can be removed if desired and attachment or detachment is only a matter of 5 minutes. The Wisconsin company's best grade of covers is made under the name "Badger Brand," which is a Neverleek fabric, commonly used in tops of many high-grade cars, over a good grade of felt padding. The Neverleek fabric does not crack or peel under any weather conditions and these covers are specially quilted, reinforced and heavily stitched, making them strong and durable. The other grade offered is the Wateo Brand—a heavy grade of enamel cloth, that is water and wind-proof, over heavy-weight Kersey cloth that retains the heat well and keeps the elements away from the radiator and hood. While this grade is not so good as the Badger Brand, it is quite satisfactory and the price is considerably lower. In finish and workmanship there is little difference between the two. The Badger Brand in the radiator cover only sells at from \$4.50 to \$5 according to the make of car that it is for, and the combined radiator and hood cover in the Badger Brand runs from \$9.50 to \$12. For Fords the radiator cover is \$2.70 and the combination, \$5.30. The Wateo Brand radiator cover sells at from \$2.50 to \$3.50 and the combination at from \$5 to \$7, according to the make of car. The size for Fords in the Wateo Brand is \$1.50 and \$3.10 for radiator and com-



C. H. F. radiator cover made especially for Cadillac cars



On the left is the Perkins-Campbell hood and radiator cover and above is that of the Auto Cape Top Co.

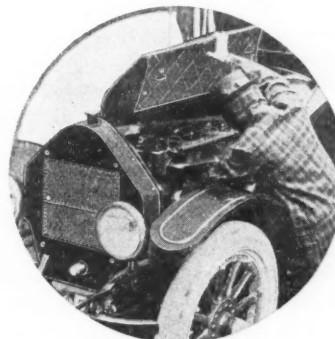
bination, respectively. The material used in both brands is black. The number of cars for which the company lists stock sizes includes some sixty different makes and a number of models for each make. Numerous patterns are carried so that the car owner can get covers for any car he wishes.

C. H. F.—Under the name C. H. F., the C. H. Foster Accessories Co., 2303 South Michigan avenue, Chicago, offers a radiator cover especially for Cadillac cars. A feature of these radiator covers is that the flap rolls from top toward the bottom, thus keeping the bottom of the radiator warm at all times. This flap is adjustable for differing weather conditions, stops being arranged 3 inches and 8 inches from the top. It is made of a high grade of material and sells for \$5. It is designed to fit all models of Cadillac cars.

Duk Bak—The hood and radiator covers made and sold by the Dafoe-Eustice Co., Detroit, Mich., are of black imitation leather with soft fiber padding and flannel lining to protect the finish of the hood. Quilting is diamond-shaped, the stitching being rather close. As the name indicates these covers shed water and are not affected by rain or snow. The radiator cover is separate from the hood cover, yet the two fasten together and this construction permits ready access to the motor and in moderate weather only the radiator cover need be used. The front of the radiator cover rolls up and is held in place by snap fasteners. The company specializes in quantity production of these covers for Fords, Dodges, Maxwells and Reo fours, the prices for these being, respectively: \$3.50 to \$4, \$7.25 to \$8, \$7 to \$7.50 and \$7.50 to \$8.25.

Frost King—Asbestos is used as an insulator in the Frost King radiator and hood covers made by the Cincinnati Auto Specialty Co., Cincinnati, O. Frost King covers are made to fit all makes of cars and when ordering the make and model of the car to which covers are to be fitted should be given. The radiator cover only for Fords is \$1.90 and the hood and radi-

ator cover complete, \$3.65, with 50 cents extra for V-shaped radiators. Radiator and hood covers combined for Chalmers, Chevrolet, Dodge, Dort, Grant four, Krit, Maxwell, Metz, Pullman, Saxon, Regal and Overland are \$4.65 and the radiator cover separate for these cars, \$2. Prices of \$2.40 and \$5.35 for radiator and combination covers, respectively, prevail for such cars as Allen, Apperson, Case, Chandler, Buick, Cadillac, Cole, Detroiter and others of this size, while \$2.65 and \$6.25 are the respec-



This shows how easy access is given to the motor when the hood and radiator cover is in place. This particular cover is the Gordon

tive prices for radiator and combination covers for larger cars such as Mercer, Marmon, Packard, Pierce-Arrow, White and Winton. Patterns are carried for almost every standard car made and orders can be filled promptly.

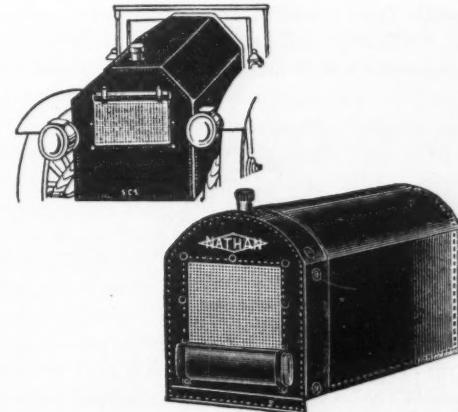
Nathan—Hood and radiator covers for all makes of cars are manufactured by the Nathan Novelty Mfg. Co., 84 Reade street, New York. A combination hood and radiator cover made of fabric leather and lined with Kersey felt is made for all models of cars and, of course, it is necessary to state the year and make of your car when ordering. This cover is made so that the radiator cover may be used alone if desired and the price complete, with all necessary fasteners is \$11. The radiator cover alone is \$5.50. A combination cover for Fords lined the same as the one mentioned above and with fabric leather on the outside is sold at \$5.50 and with artificial leather,

\$3.10. There is one type that has an outer covering of artificial leather and lined with heavy felt that sells for \$2.60. The radiator cover alone for Fords in the three grades mentioned above sell for \$2.10, \$1.65 and \$1.40, respectively.

Monarch—Monarch hood and radiator covers, made by the Monarch Carriage Goods Co., Cincinnati, O., are made with an outer covering of oiled duck with fleece lining. The outer covering is guaranteed not to crack or leak. This company makes a muslin and drill cover with a heavy padding which can be had if desired. The covers are made for Fords only and are sold only through jobbers.

Phillips—Moleskin covers with fleece lining are made for radiators by the Phillips Auto Seat Cover Co., 244 West Forty-ninth street, New York. The front flap of the radiator cover rolls from the top toward the bottom, so that as much or as little air as may be desired can be admitted to the radiator. These covers are furnished for all makes of cars and have the reputation of being perfect-fitting. Prices range from \$3 to \$6, according to the size of the car.

Simon—Three grades of material and two types of construction are employed by S. C. Simon & Co., Philadelphia, Pa., in the production of Simon hood and radiator covers. Of the three grades of material there are: One with rubber drill outside and a felt lining, one with rubber duck outside and heavy felt lining, and the third has Fabrikoid outside with heavy felt lining. Both one and two-piece varieties are made. In the one-piece combination hood and radiator covers for the older Fords the drill is \$2.50, the duck, \$4 and the Fabrikoid, or mohair, \$5. For the newer Fords the prices are \$3, \$4.50 and \$5.50, respectively, for these three grades of material. Covers in this classification for all four-cylinder cars are \$5, \$6 and \$7, respectively, for the three grades mentioned above and for six-, eight- and twelve-cylinder cars, \$6, \$7 and \$8. Two-piece covers, which are held together with curtain fasteners for the older Fords are \$3, \$4.50 and \$5.50, respectively, for drill, duck and mohair, and \$3.50, \$5 and \$6 for the newer models. Four-cylinder car



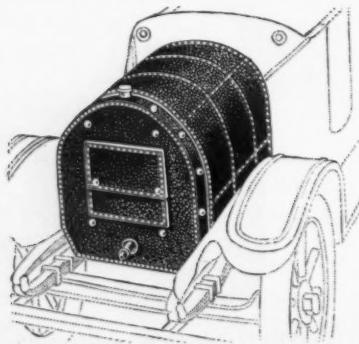
Above is the Simon hood and radiator cover and below the Nathan

covers in the two-piece sell for \$6, \$7 and \$8 and six-, eight- and twelve-cylinder car covers sell for \$7, \$8 and \$9.

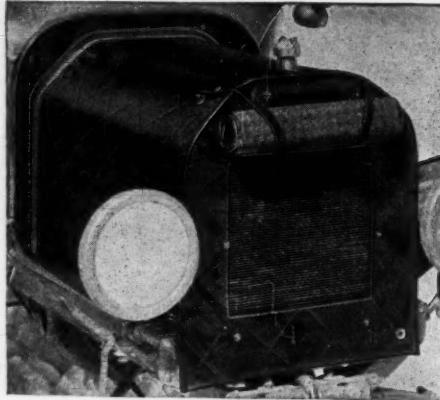
Auto-Cape—The Auto Cape Top Co., 2334 South Michigan avenue, Chicago, makes radiator and hood covers to order. It has patterns for many of the older models and is rapidly getting patterns for the newer types of cars. It uses a heavy grade of curtain material for the outside of its covers and a lining of heavy felt. It claims for its covers that they are made to retain their shape and lists its radiator covers of the straight type at \$3.50 and for V-shaped radiators at \$5. The hood and radiator cover is in two pieces, that for the hood being quilted, while the radiator cover is heavily stitched and the curtain adjustable to vary the amount of air allowed to pass in through the radiator.

Perkins-Campbell—A new line of radiator and hood covers for every make of car is offered by the Perkins-Campbell Co., 622 Broadway, Cincinnati, O. The patterns are of individual designs and all lined and insulated covers are neatly quilted. The radiator covers have 2-inch quilted diamonds and the hood covers 4-inch diamonds. Three grades of radiator and engine covers are offered for Fords. One is made of waterproof, fleece-lined material, with doors that roll up. Another is made of three-ply material. The outside is of water-proof, imitation leather and the inside of Kersey blanket material and between those is a layer of asbestos. Another is of two-ply construction, the outside being of waterproof, imitation leather and the inside of Kersey blanket material.

Sickles—Hood and radiator covers made under the name of Sickles have an outer covering of extra heavy rubber duck that is wind- and water-proof, and two grades of inner lining. The grade known as No. 10 is lined with heavy Kersey cloth and the No. 20 with a heavy grade of hair felt, designed to meet the requirements in very cold weather. Both styles have reinforcements of leather which prevents the pulling out and tearing of seams. The fasteners used on these covers are made especially for them with the idea of producing a button that will stay fastened and not become weak from constant use. The maker, the J. B. Sickles Saddlery Co., St. Louis, Mo., is prepared to furnish covers for any make



Sickles hood and radiator cover



Duk-Bak hood and radiator cover

or model of car and will quote prices on application. The price range is from \$5.50 to \$11.50, according to the size of the car for which the covers are to be used.

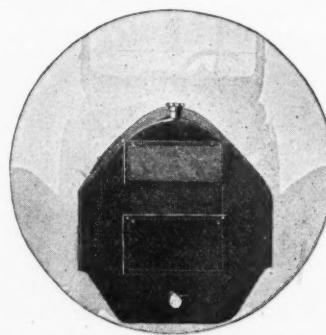
McKinnon — Radiator and hood covers for all makes of cars are made by the McKinnon Dash Co., Buffalo, N. Y., and those for the more popular makes of cars are carried in stock, but special orders require only a short time to fill. A dull-finish, water-proof material with Kersey lining is used in the covers for Fords, the radiator cover only for the 1916 and 1917 models being \$1.40 and \$1.55 respectively. Two-piece radiator and hood covers for these two models are \$2.40 and \$2.55 and there is one made in one-piece for these two models at \$2.16 and \$2.98. Both the grades mentioned above and another in which a good grade of imitation leather over a felt lining is used make up the line for other makes of cars. In the first class the radiator covers only range in price from \$1.75 to \$2.75 and in the second from \$3.50 to \$4.50. In the combination radiator and hood covers in the first class prices run from \$4.25 to \$6 and in the second, or imitation leather grade, from \$8.50 to \$11. These covers are all quilted and substantially made.

Glover—The Glover Equipment Co., Indianapolis, Ind., offers a radiator cover that is rather a departure from the ordinary type in that the openings to allow a passage of air to circulate through the radiator are made smaller or larger as desired by pressing a button and turning a section of the cover that resembles a fan having six blades. This fan-shaped part revolves and either covers or opens apertures in the remainder of the cover that correspond with it in size and shape. It is the old pepperbox plan of opening and closing. The cover is made of artificial leather, wool felt cloth and sheet steel. It is tailored and assembled so as to be attractive in appearance and is made for all cars, but not in colors to match the car finish. Three sizes of radiator covers are made, a small size for such cars as Ford, Maxwell, Monroe and others of that caliber at \$4.50; a medium size for Overland, Buick, Dodge, Reo and Empire and others of that class at \$5.50 and a large

size for Packard, Cole, Marmon, Pierce, Cadillac, etc., at \$6.50. A hood cover also is made for all cars having straight front radiators. When ordering it is necessary to give the name and model of the car. These come in three sizes; small, \$3; medium, \$3.50 and large, \$3.75.

Allen—A black imitation leather with a robe plush lining is used in the construction of the radiator covers made by the Allen Auto Specialty Co., 1926 Broadway, New York. Covers are also made in enamel duck in colors desired without extra charge. The flap on the front of the radiator cover is held in place by ball and socket buttons, the flap rolling toward the bottom of the radiator. Covers are made only to order and are not subject to return unless defective. When ordering the name and model of car should be given. The price of the radiator cover for all cars except the Ford is \$7; the Ford, \$4. The company also makes hood covers, but does not make a specialty of producing hood covers. The price of hood covers is \$12 for four-cylinder cars and \$15 for six-cylinder cars, in addition to the cost of the radiator cover.

Warner—The hood and radiator covers produced by the Warner Auto Top Co., Cincinnati, O., are made in two grades—Nos. 1 and 2. The first is a good quality of enameled cloth which is water- and wind-proof and lined with a heavy blanket material. The No. 2 is made of extra heavy quality of imitation upholstery leather, with a water- and wind-proof outer surface, guaranteed not to crack or peel, and the lining is of heavy felt. The hood cover is quilted and the opening in the radiator cover divides in the center, half of the flap rolling up and the other half down. These covers are made for nearly all types of cars and when ordering it is necessary to give the year and model of the car for which the cover is desired. The prices of radiator covers only for Fords in the No. 1 grade is \$1.55 and in the No. 2 grade, \$3.10, while the combination for Fords is \$2.85 and \$5.75 respectively for the No. 1 and No. 2 grades. The No. 1 radiator cover for other cars range from \$2.10 to \$2.75 and the combination from \$4.60 to \$8. The No. 2 grade radiator covers for cars other than Fords sells at from \$3.75 to \$6, and the combination hood and radiator covers at from \$8.25 to \$13.25, according to the make of car.



Wisconsin cover for hood and radiator



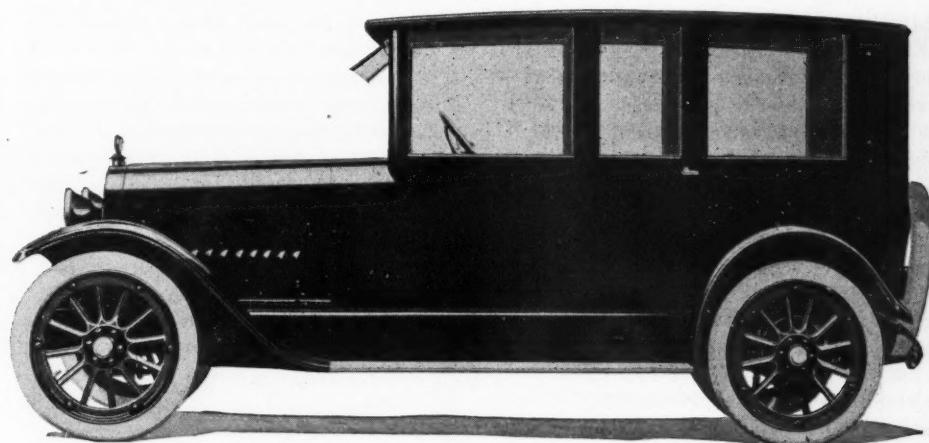
Looking both ways inside of the new Jeffery sedan. Because of the divided front seats, fore-doors are unnecessary

Sedans Bodies for Jeffery Fours and Sixes

Large Windows and Complete Appointments Evident in New Winter Offerings

TWO new Jeffery sedans are offered by the Nash Motors Co., Kenosha, Wis., for the winter season. Simplicity in lines, interior luxury and completeness of fittings are the features that first impress one in the new bodies. Models are ready for the four and six-cylinder chassis and both sedans have ample accommodations for seven passengers.

One of the noticeable features of the bodies is the large size of the French-plate windows. These are equipped to drop 5 inches for warm weather ventilation, and as the drop comes at the top there is a good circulation of air without the draft coming on the heads of the passengers.



Direct side view of Jeffery sedan in which simplicity in design is readily noticeable

No fore doors are provided, access to the front compartment being through the divided seats.

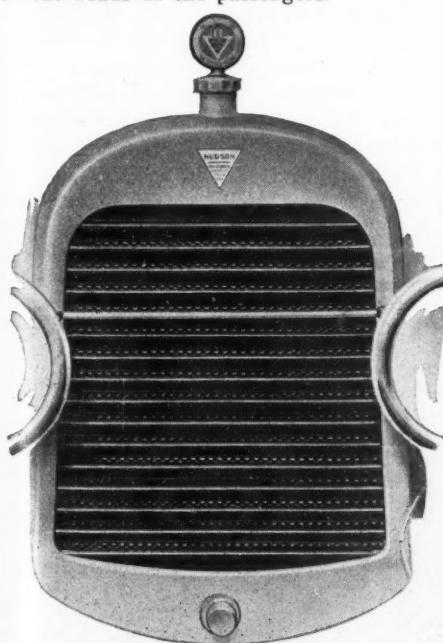
The upholstery is gray whipcord with roll curtains on the windows and numerous other refinement details which give the car a complete equipment. The top is close-fitting throughout, rain snow and sleet-tight.

An added touch is the large dome light in the center of the top. The shade is well selected to give a bright yet soft light.

conforms with the shape of the regular shell. To apply the shutter the sub-shell is fitted over the radiator cap and regular shell and fastened at the bottom with two screws. The drilling of these two screw holes and fitting of the shutter operating mechanism are the only alterations necessary.

STUDEBAKER DEALERS CONFER

South Bend, Ind., Nov. 25—More than 225 officials, branch managers, and dealers connected with the Studebaker Corp. sales department, were entertained, last Wednesday, at the annual conference. The program which started in South Bend was concluded Thursday and Friday at the Detroit factory, followed by private conferences with branch managers on Saturday. The yearly conference is a sort of debutante party for the new model car, which is brought out about this time. Four principal addresses were delivered at the meeting Wednesday morning in the administration building.

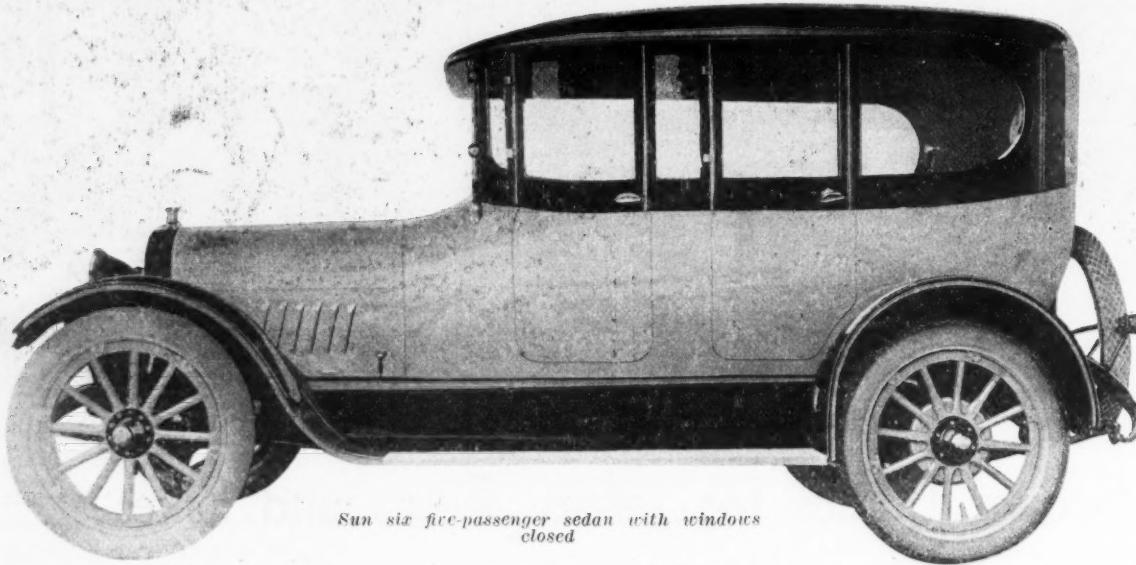


The Boyce Moto-Meter is an essential part of the recently announced Hudson radiator shutter. This instrument is the tell-tale which permits the driver to regulate the water temperature

MOTO-METER ON RADIATOR SHUTTER

The Boyce Moto-Meter is an essential part of the Hudson shutter system announced in the November 16 issue of Motor Age. As the temperature of the water may be readily and quickly controlled with the Hudson shutter it is necessary that the driver know at a glance just what the temperature is. This information is furnished by the Moto-Meter. The shutter may be applied to any Super-Six. It is contained within a shell which exactly

No Price Change on 1917 Sun Models



Double Cowl and Slanting Windshield Feature Improved Bodies

WHILE the chassis of the 1917 Sun six remains practically unchanged, the body has been refined and beautified to a marked degree. The popular double cowl has been adopted, as has the slanting windshield. The Sun Motor Car Co., Elkhart, Ind., which makes this car, announces a five-passenger touring, seven-passenger touring, a four-passenger roadster and a five-passenger sedan. Contrary to the majority of 1917 announcements the Sun company has left the prices where they were, these ranging from \$1,095 to \$1,295. The double cowl is found on the four-passenger roadster and seven-passenger touring bodies. These are built with high body sides which almost eliminate any rise in the body line at the center cowl. The slanting windshield appears on all models. A new standard finish has been adopted which is royal blue with cream-colored wheels.

Distinctive Features in Design

Although the Sun car is an assembled job, it presents several individual features which are distinctive. The motor is of exclusive Sun design with valves on the right side and tappets adjustable through hand-hole plates on the side of the motor. The bore is $3\frac{1}{8}$ and the stroke 5 in. Valves are operated from the cam through roller guides. One of the unusual features of the motor is the method of lubricating the valve-operating mechanism. All parts are exposed to the splash of the connecting rods. The valve guides may be readily removed from the motor, as they are cast integral with the larger hand-hole plates on the side of the motor block. The valves themselves are $1\frac{1}{8}$ inches in diameter, one-half the diameter of the cylinders.

The crankshaft is 2 inches on all bearings and is forged from .40 to .50 carbon

steel, with crank arms of the curved and balanced type.

The motor is lubricated by a piston pump driven from its individual cam on the cam-shaft. Oil from the reservoir passes through a filter screen and is then forced from the pump into the main supply line from which it passes over the connecting-rod bearings and is forced into the main and camshaft bearings. Another lead takes care of the timing gears. The cylinders are lubricated by splash from troughs under the connecting rods.

Dual Ejector Exhaust

The accessories include a Rayfield carburetor and dual-ejector exhaust. In the latter the manifold is of the Y type and carries away the gases from the three front cylinders separate from the gases of the rear cylinders. These gases are separated by a web that is cast at each cylinder port which tends to guide the gas in the right direction.

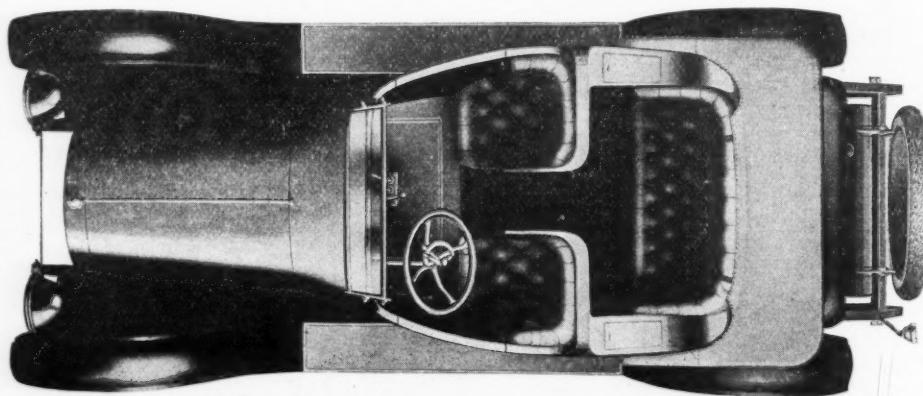
Ignition as well as starting and lighting is by a Remy system. The generator is

mounted on the right side of the motor at the front and is driven directly from the timing gears. The starter operates on the flywheel through a Bendix pinion. The switch pedal of the starter is on the toe board.

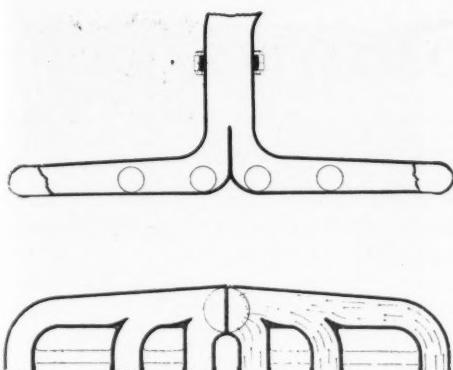
A centrifugal pump takes care of the cooling in conjunction with a four-blade fan, both mounted on the front of the motor in accessible locations.

The chassis presents a number of interesting features, among them being the frame design. The frame is of $\frac{3}{8}$ -in. stock with $4\frac{1}{2}$ -in. channel section, 42 in. wide at the rear and narrowing to 28 in. in front. A short turning radius is thus permitted. There are five cross members and the 20-gal. gasoline tank is supported from the frame extension in the rear without brackets. Spiral-bevels drive the floating rear axle and torsion is taken through the rear springs. The rear springs are semi-elliptic and underslung, with a 52-in. length and $2\frac{1}{4}$ -in. width.

The speedometer, dash light, ammeter,



Seating arrangement of Sun six four-passenger roadster. The rear seat is unusually wide for bodies of this type



Side and top cut-away views of Sun exhaust manifold, showing division in center which takes care of three cylinders on each side

carburetor control button, ignition and lighting switch with fuse blocks are all in one panel on the cowl board. Tires are 34 by 4 with non-skids on the rear. The wheelbase is 116 in.

MONROE PRICE \$985

Through a typographical error the price of the new Monroe five-passenger touring car was stated as \$795 in the head on page 50 of the November 23 issue of Motor Age, although the correct price of \$985 appeared later in the description.

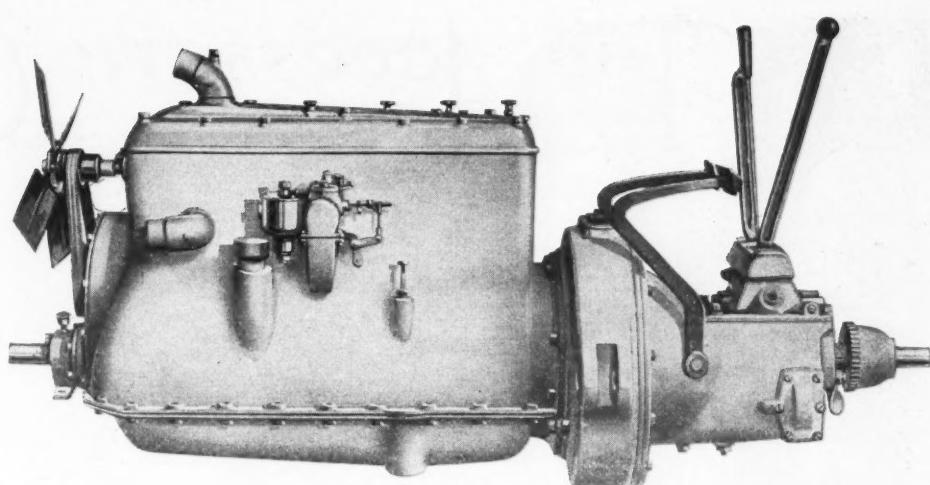
EMPIRE HAS INCLOSED CAR

Entering the field of closed cars for the first time, the Empire Automobile Co., Indianapolis, Ind., announces a sedan type to be ready for delivery about December 1. The latest addition to this line is of the convertible type, with all windows readily removable for warm weather use.

There are two doors, one on each side, about midway of the body. These entrances open into the rear compartment, and access to the front compartment is through an aisleway between the divided seats.

The car is thoroughly appointed with upholstery of gray and black Bedford cord. There are four interior lights, including a dome light, dash light and lights at either side of the rear window. A noteworthy convenience is found in the two cellarettes or package compartments behind the rear seat cushion.

The price has not yet been set on this particular Empire model.



The carburetor side of the Sun six-cylinder motor might be termed ultra-clean. The intake manifold is embodied in the cylinder casting

Dodge Bros. Plant Includes 77 Acres

11,000 Men Employed by 22-Month-Old Organization

THE Dodge Bros. Co., beginning business 22 months ago with approximately 20 acres of floor space, have expanded with such rapidity that the plant now includes 77 acres, and constantly increasing additions soon will add to that amount. The company employs 11,000 men and is turning out 350 motor cars a day. The plant, because of its recent construction embodies practically every known device for efficient production.

The factory is so constructed that the main building, occupying ground space 800 by 60 feet, and five stories high, lies from east to west and allows all other structures to feed to it from north to south. The main building includes the shipping departments, woodwork, core and mould shops, factory offices, service school, assembly plant, trim shop, top making, and the enameling ovens. Facing it from the north are the gear grinding building, the drop forge shop, the old foundry building, the new foundry building, the carpenter shop and the body building. New structures in process of construction include an eight-story building 125 by 310 feet which will be used for storage, a body building, an addition to

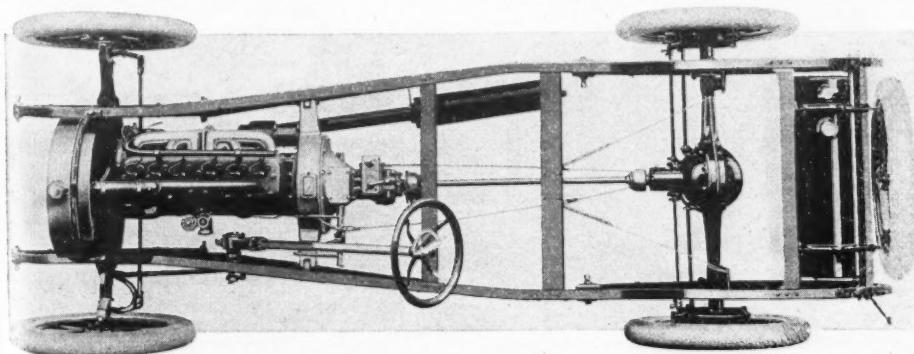
the garage and a five-story foundry 65 by 400 feet besides an extension of five stories to the carpenter shop.

A service school is in operation which every employe must attend and which aids them to become familiar with the company's product as they are taught the technical points about the rear axle, gearset, clutch, electrical equipment and gas and driving. Workers are obliged to attend 5 days a week and must pass an examination with a percentage of eighty or more.

The company has installed numerous appliances to increase production. A system of enameling ovens costing \$150,000, operated with an overhead conveyor 800 feet long, carries the bodies through the fourth and fifth floors of the building, passes them to the upper floor by means of a chute and finishes 1,500 bodies daily. Fifty steam hammers have been added to the drop forge plant with a capacity of from 400 to 7,500 pounds that turn out 20,000 pounds of steel daily. Twenty furnaces and twenty cyanide pots have increased the facilities of the heat treating room to the point where its capacity reaches 70,000 parts treated daily. One hundred and eighty pounds of cyanide are used per day.

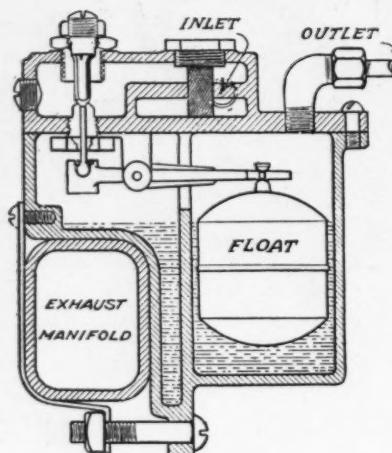
The cylinder department machines 400 complete cylinder blocks, oil pans, transmission cores, steering gear cases and differential housings daily. One hundred and seventy-six gear cutting machines cut 8,000 gears per day, and the screw machine department produces 250,000 parts for every 24 hours.

Similar equipments including facilities for the ears of a stupendous production are to be found in every department. The company uses 8,000 pounds of hair, 310 full hides, 50,000 yards of mohair, 30,000 pounds of brass, 10,000 pounds of aluminum and 15,000 gallons of fuel oil daily.

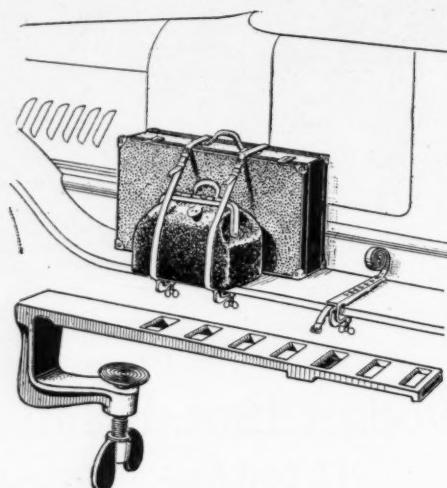


Simplicity marks the chassis construction of the new Sun with three-point suspended power plant and torque taken through the springs

The Accessory Corner



Sectional view showing construction of Gemco steam vaporizer



Luggage carrier which may be readily clamped onto or removed from running board

Running-Board Luggage Carrier

GEMCO luggage carriers are securely fastened to the running board by means of thumb screws. It is not necessary to drill any holes through the running board. It is claimed that the device will not rattle or work loose if properly installed. Suit cases, traveling bags, golf bags or parcels of any size may be safely carried and can be quickly strapped in place and removed. They do not touch the side of the body to mar the finish. The carriers may be removed in an instant and stowed away. Price, \$2.50. The Gemco steam vaporizer is fastened to the top of the exhaust manifold and delivers steam to the intake manifold. The water is held within a sealed container and begins to give off vapor as soon as the exhaust pipe is heated. The regular water system is the source of supply and the vaporizer needs no attention after it is once installed. Prices: Ford size, \$11; for 1½- and 2-in. diameter exhaust pipes, \$12; for 2½-in. and over, \$12. Gemco Mfg. Co., Milwaukee, Wis.

Textile Folding Bucket

Hinson's textile bucket is made of genuine 12 ounce army duck. It is treated with a preparation to make it water and mildew proof, and is dark brown in color. The bucket can be folded compactly and laid away under the seat or in the tool box. The capacity is about 2 gal. The top is shaped with a galvanized-iron ring and this is formed into a spout. There is a strap handle 15-in. long over the top. It is marketed by the Powers Mfg. Co., Brighton Station, Cincinnati, Ohio. The same concern markets the Powers anti-draft shield for use on Ford cars. This shield fits between the top and windshield and is designed to keep out the rain, snow and cold winds. It is made of 32-ounce

in a small charge from the main gasoline line, and a down-stroke shoots the charge, vaporized, into the manifold. All connections are made by compression couplings which require no soldering or threading. The price is \$5. Imperial Brass Mfg. Co., 1200 West Harrison street, Chicago.

Walden Double Offset Wrenches

The sockets of the Walden wrenches are placed at the end of a long handle that is bent in the form of a Z. These sockets are made of a solid steel bar, machined turned and broached to size. The handles are made of steel rod and have a length of 9 inches. They are made by the Walden Mfg. Co., Worcester, Mass. Price, No. 200, set of 5 wrenches, \$2.

Temco Tool Bag

A cotton duck fabric tool bag for the repairman or driver in which the tools are all carried in one compartment, having a large opening in the side, thus rendering the tools readily accessible, is found in the Temco. This opening is closed by a large flap, held by two snap clasps that permit quick opening and closing. The bag is carried by a heavy canvas handle. It is made by the Temco Electric Co., Leipsic, O. Price \$1.25.

Crankcase Oil Wrench for Fords

This is an extension wrench for opening and closing the oil testing petcocks of the Ford. The handle has an overall length of 25 in., and the wrench is finished in black enamel. It is claimed to permit the petcocks to be readily opened, and may be carried beneath the front seat cushion. Dow Wire & Iron Works, Louisville, Ky. Price, 50 cents.

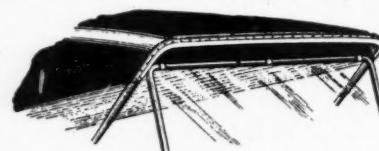
Top Covering for All Cars

To permit an owner to avoid the saggy, leaky and ill-shaped top the J. P. Gordon Co., Columbus, O., has just introduced a

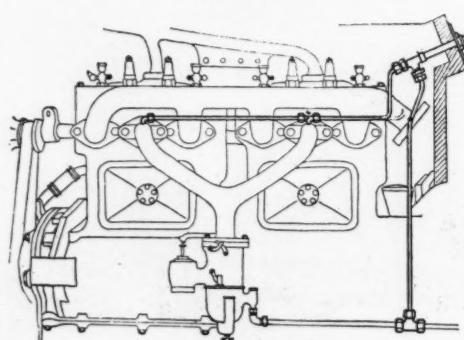
enameled-rubber duck, with strong spring clips which fasten to the windshield and with curtain fasteners and eyelets which fasten the shield to the top. It can be installed in 5 minutes, and removed and replaced in 30 seconds, according to the makers. The textile bucket sells for \$12 per dozen, the anti-draft shield for \$15 per dozen.

Primer on the Cowl Board

The Imperial primer is an easily-installed plunger-pump outfit which throws a rich spray of vaporized gasoline into the manifold near the entrance to the cylinders. It consists of a small plunger, along with which are furnished the necessary bolts, connections and tubing for mounting on the dash of any car. To operate, the lever is given an up-stroke and the pump draws



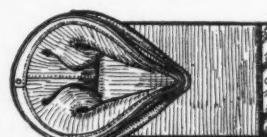
Anti-draft shield to keep out rain and snow from space between Ford top and windshield



Showing installation of Imperial primer with pump on dash board

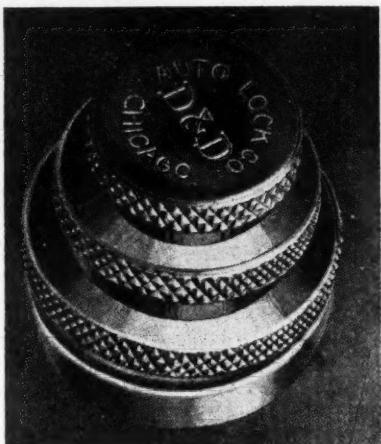


SHOWING BUCKET IN USE



SHOWING BUCKET WHEN FOLDED

Folding bucket made of waterproofed 12-ounce army duck



Combination lock which fits on cowl. The ignition circuit is cut off or switched on by this lock

replacement system whereby it renews top coverings for any make of car at a reasonable price and promptly. Delivery is assured within 3 days after the top reaches the factory. It is only necessary for the car owner to remove the old top covering and ship it to the factory, where new material will be cut, either of rubber cloth or mohair.

Gas-Tite Piston Rings

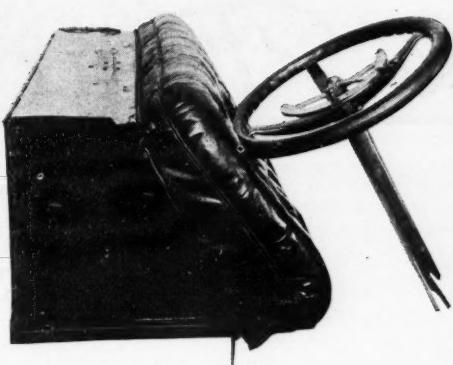
The Gas-Tite ring is of one-piece concentric form, the joint being milled to form transverse, oppositely inclined abutting ends. The inner cut extends past the center of the ring and the outer cut not reaching the center. This joint makes a continuous seal. A small opening leading under the ring on the pressure side is to allow the gas to enter and expand the ring according to the load the motor is pulling. The list price is 50 cents each for sizes under 5 inches. Bilt-Rite Specialty Co., Moberly, Mo.

Reboring Machine for Ford Motor

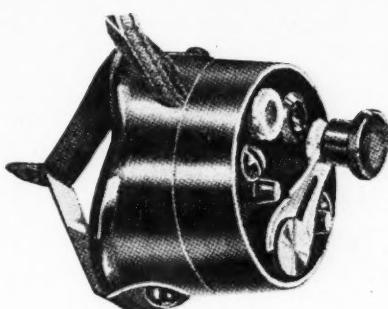
The Storm & O'Hair Co., Thompson, Ia., manufacturer of cylinder-reboring machines announces a new tool especially designed for use on Ford motors. The cutters in this machine are universally adjustable and can be set to cut any desired amount. Each cylinder is rebored and finished to any desired oversize with only one operation. It is said to be simple, speedy and accurate, and can be operated by hand, low-speed drill press or other power. The parts are interchangeable with the parts of the universal machine made by this concern.

Combination Trunk and Lock

When the car is being driven the combination trunk is folded under the front-seat cushion. When the car is left unattended, the front cushion tilts forward until it presses against the steering wheel and the trunk unfolds, filling the space between the cushion and the seat back, giving a space where robes and other valuables may be locked in. At the same time the fit of the cushion against the steering wheel makes driving of the car impossible. The trunk is strongly constructed of sheet



Combination trunk and lock to prevent car theft



Switch which permits one bright light, ordinary lights or dimmed lights for Ford cars

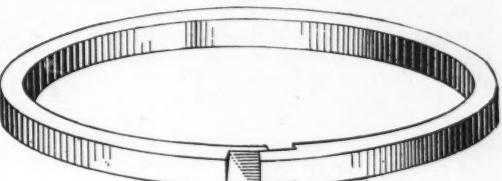
metal. When the trunk is collapsed it raises the cushion only an inch. The entire device is hinged to swing forward, affording access to the gasoline tank or tool box. William Warnock Co., Sioux City, Iowa.

Skid-Not Black-Tread Tire

There are no humps in the center of the skid-not tire, meaning that the point of wear in the center of the tread is smooth and the thickest part is where the wear is greatest. The mortised depressions are on the sides of the tread so located, it is claimed, that skidding is effectually prevented. The tire material is heavy where the greatest strain occurs. It is a product of the Brunswick-Balke-Collender Co.,



Two non-skid treads of the Racine Rubber Co., the rusty tread and the country road



Gas-Tite one-piece piston ring of concentric form

Chicago, which is also manufacturing a complete line of tire accessories including tubes, patches, boots, etc. The guarantee on the casings is based on a 5,000-mile policy.

Variable Lighting for Fords

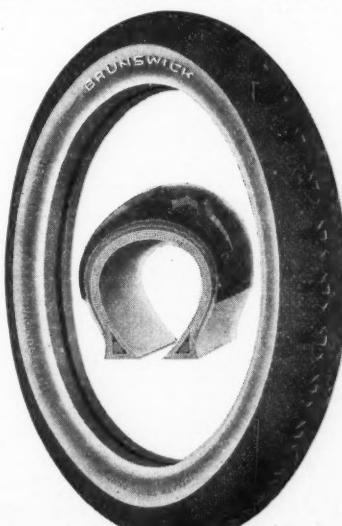
One can turn all the current to the left light, which will give a good bright light, switch to another point and light both lights, or switch to yet another point and have dimmers with the use of the Phelps lighting system for Ford cars. The switch clamps onto the steering column just below the wheel. The price is \$2.50. Automobile Supply Co., 1335 Michigan, Chicago.

Racine Tires in Three Treads

A plain tread and two non-skids, the country road and rusty tread, constitute the offerings of the Racine Rubber Co., Racine, Wis. The plain tread is of wrapped construction and bears a 3,500-mile guarantee. The country road has a tread of the depression type with a smooth top surface, the non-skid depressions being located on the sides of the tread. The rusty tread is of the studded type with elongated studs staggered in three rows.

Motor-Car Lock Without a Key

The D. & D. is a lock which is built into the cowl board beside the ignition switch which must be set to a certain combination before a spark will be sent to the plugs. The combinations, all different, are set at the factory. The setting is gained by turning three knurled rings to the proper positions. It sells for \$5. The D. & D. Lock Co., 20 East Jackson boulevard, Chicago.



Brunswick-Balke-Collender skid-not tread tire with mortises on the sides of the tread

From the Four Winds

OREGON Organizes Association—The West Side Pacific Highway Association was organized at Dallas, Ore., recently with C. H. Moores as president and W. T. Vinton as secretary. Oregon now has 32,650 motor cars, a net increase of more than 9,000 cars over the registration of 1915.

Names Trail for President—The Oklahoma state motor car association has named the road from Oklahoma City to Alva the Young trail in honor of G. W. Young, president of the association. Poles with a white band mark the straight stretches of the trail, and poles with green bands, the turns. The road goes by way of Yukon, then north and west to Alva.

Cleveland Club Moves—The Cleveland Automobile Club has moved into new quarters on the entire third floor of the new addition to the Hollenden Hotel. The space was planned with the club's needs in mind. A large room just within the entrance to the quarters contains the counter where the touring and general information departments, license bureau and telephone exchange will be available. Standing desks will be provided for applicants for licenses.

Clubs to Post Southwest—The Automobile Club of Southern California has undertaken an extensive sign-posting campaign in the deserts of the Southwest. Many motorists have suffered, and several have lost their lives recently, because of unfamiliarity with water holes. The desert roads are often mere scratches on the sand and are entirely obliterated by each wind storm. Special instructions are being prepared for every driver who contemplates a desert trip. In the Imperial Valley plank roads have been put down. These are shifted from time to time to free the boards of the drifted sand.

Good Roads Work

Association Extends Highway—The Indian Head Trail Association has decided to extend the highway from Peoria, Ill., to Minneapolis.

Gives \$1,000 for Road—The Automobile Trade Association of Minneapolis has voted \$1,000 to the Duluth-Twin Cities road. The road is to be called the Minnesota Federal highway, and it has been accepted by the state highway commission.

Indiana Wants Highway Commission—Tired of being one of the only three states in the Union without a highway commission, Indiana may yet have a department to take over the building and maintenance of public highways in the state. Recently representatives of more than thirty state organizations met in Indianapolis to combine to bring pressure to bear on the enactment of bill to be presented to the state legislature this winter.

Rotary Clubs Champion Badger Road—The strength of the Wisconsin Rotary clubs has been put behind a movement to improve a trunk highway running diagonally across the state of Wisconsin, from Milwaukee to Superior, at the Head-of-the-Lakes. The idea is original with the Rotary Club of Superior, which finds much appeal in the fact that federal aid for good roads is offered only for permanent highway improvement on trunk highways. Wisconsin grants state aid almost exclusively for similar purposes. It is figured that a trunk highway between the largest and the second largest city in Wisconsin will be the most popular and generally profitable improvement that could be undertaken, having

due regard to the purposes of federal aid. Milwaukee Rotary clubmen are co-operating with those of Superior and will try to bring matters to a point where actual work on such a highway can begin early in 1917.

Coast State to Help Nevada—For the first time a state is to help a neighbor build roads. California is to raise \$50,000 to be expended on the Lincoln highway in Nevada. The Lincoln highway commission is now a part of the San Francisco Chamber of Commerce and the Oakland Chamber of Commerce, and these two commissions will form the Pacific Coast Lincoln Highway Co-operative Association. California has been divided into county sections to raise the money.

Women Indorse Bonds; Defeated—Women are stronger for good roads than the men. In St. Clair county, Ill., there was a proposi-

Coming Motor Events

RACES

—1916—

†November 30—Speedway, Los Angeles, Cal.
November 30—Speedway, Uniontown, Pa.

*December 25—Speedway, Los Angeles, Cal.

—1917—

May 19—Metropolitan Trophy, New York speedway.
†May 30—Indianapolis speedway.
June 9—Chicago speedway.
June 23—Cincinnati speedway.
July 4—Omaha speedway.
July 14—Des Moines speedway.
July 28—Tacoma speedway.
August 4—Kansas City speedway.
†September 3—Cincinnati speedway.
†September 15—Providence speedway.
†September 29—New York speedway.
October 6—Kansas City speedway.
October 13—Chicago speedway.
October 27—New York speedway.

*Sanctioned by A. A. A.

†A. A. A. championship events for 1917.

MEETINGS

December 7-9—Annual convention, Safety First Federation of America.
January 9-11—Mid-winter meeting, Society of Automobile Engineers.

SHOWS

December 2-9—Springfield, Mass., show.
December 7-9—Pasadena, Cal., show.
December 18-20—San Francisco show.
December 30-January 6—Cleveland, O., show.
January 2-10—Salon, Hotel Astor, New York.
January 5-11—Milwaukee, Wis., show.
January 6-13—New York show.
January 9-10—Fort Dodge, Ia., show.
January 13-27—Montreal, Can., show.
January 20-27—Detroit show.
January 22-27—Oklahoma City show.
January 22-27—Rochester, N. Y., show.
January 23-27—Baltimore show.
January 27—February 3—Chicago show.
January 29—February 3—Buffalo show.
February 3-10—Minneapolis show.
February 10-17—San Francisco show.
February 12-17—Kansas City show.
February 12-17—Louisville, Ky., show.
February 18-25—St. Louis, Mo., show.
February 19—Pittsfield, Mass., show.
February 19-24—Des Moines, Ia., show.
February 26—March 3—Omaha, Neb., show.
March 3-10—Boston show.
March 6-10—Fort Dodge, Ia., show.
March 14-17—Davenport, Ia., show.
March 14-17—Mason City, Ia., show

tion before the voters at the recent election to issue \$1,500,000 bonds for roads. The women voted for this and caused it to carry, but they had no vote on the question of increased taxes to support the bond issue, this being printed on the men's ballot only, owing to the peculiar Illinois laws. The men defeated the tax measure.

Road Work in Wisconsin—About \$5,000,000 has been expended on permanent highway improvement work in Wisconsin during 1916, according to estimates prepared by A. R. Hirst, chief engineer of the Wisconsin state highway commission. The total mileage constructed under the state aid system is 1,158, the cost of which was \$3,631,026. In addition, 352 bridges were constructed, making a grand total of \$4,171,094 expended with state aid. The mileage added gives the state a total of 4,850 miles built under the state aid system in the 5 years that it has been in effect. Next year it is expected that 1,300 miles of road and 433 bridges will be built, the appropriation available for this purpose being \$4,500,000.

May Test Road Act—Though revised returns show that the so-called Egan Good-Roads Act was approved by the voters of New Jersey by nearly a 60,000 majority, opposition that may lead to a court test of its constitutionality has developed. In several sections of the state there is strong opposition to the carrying out of the provisions of the act on the ground that it is unworkable, the claim being that more miles of road are to be paved than the appropriation will pay for. In Atlantic county a factional fight over the right of the board of freeholders to make a contract favoring a certain make of paving material is threatening the act with court proceedings.

The Show Circuit

Show Helps Fair Pay—The financial reports for the Brockton, Mass., fair show that the best paying attraction was the motor car show. The association received \$19,640 from the exhibitors.

Pittsfield, Mass., Show—The second annual motor show at Pittsfield, Mass., is to be held during the week beginning Feb. 19 in the armory. James J. Callahan has been appointed manager, and he has sold the greater part of the floor space already.

Louisville Motor Show—The tenth annual exhibition of the Louisville Automobile Dealers' Association will be held Feb. 12-17. The show as usual will be staged in the First regiment armory, which covers 54,000 sq. ft. of floor space.

Show Off; No Space—The Fort Wayne Auto Trades Association will not hold its customary show this year as no adequate building can be procured in which to present the display. Last year's show was successful, and members of the organization are very anxious to stage another this year, but a careful search of the city reveals no adequate building space.

Big Space for Twin City Show—With a show building for the tenth annual event of the Minneapolis Automobile Trade Association, Feb. 3-10, 1917, that has 22,000 square feet more than the Armory-Annen utilized for years, or 85,000 feet, 80 per cent was reserved by members. The result is that 36,000 feet in the basement of the three-story Mazda plant of the Cleveland Lamp Co. is to be opened.



Among the Makers and Dealers



PULLMORE Truck Organized—The Pullmore Motor Truck Co. has been organized at New Castle, O., with a capital of \$600,000.

S. V. G. Creditors Meet—The creditors of the S. V. G. Co., Reading, Pa., manufacturer of the S. V. G. car, recently met in Wilmington, Del., to take action on the distribution of \$85,000 in the receiver's hands.

Hammers Hackett Consulting Engineer—Morgan J. Hammers has been retained as consulting engineer for the Hackett Motor Car Co., Detroit, Mich., and has been made a non-resident director of the company.

Allen with Bour-Davis—Robert Allen has been made the southern district sales manager for the Bour-Davis Motor Co., Detroit, Mich. Mr. Allen was formerly the manager of the Dallas, Tex., branch of the Chevrolet Motor Co.

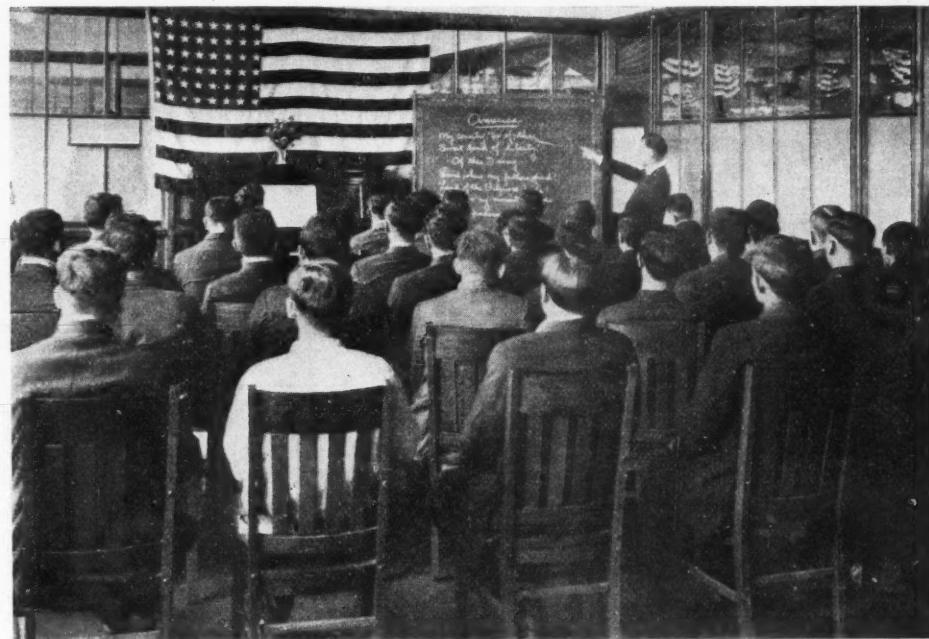
Prest-O-Lite Makes Milwaukee Changes—The Milwaukee territorial organization of the Prest-O-Lite Co., Inc., has been reorganized. C. F. Mitchell, manager of the Milwaukee branch, has been promoted to division manager, with headquarters at Milwaukee, Wis. He is succeeded by E. P. Drummond.

To Build Million Dollar Plant—The Moreland Motor Truck Co., Los Angeles, is planning a new million dollar plant for the construction of its trucks. Five sites are said to have been offered already, and some of the suburban towns have offered inducements. The company has been assembling trucks in Los Angeles for about 5 years. A 5-ton worm drive model has been added to the output recently.

Revivo Files Bankruptcy Plea—R. H. Courtney, trustee for the Kentucky Revivo Battery Co., Louisville, Ky., has filed a petition in the bankruptcy court to have stockholders of the company show cause why they should not be assessed to make up an amount sufficient to pay off the concern's remaining indebtedness. The petition shows claims against the concern to be \$3,671, with assets on hand about \$367.

Canadian Plant Works Overtime—The Canadian Ford plant at Ford, Ont., is working day and night in the effort to keep up with the demand, which seems to be more insistent as the weeks go by. The demand is away ahead of production, and further extensive additions to the factory are now under way. The foundation is being laid for an addition to the machine shop, which will almost double its present capacity and production, and work is going ahead on a large addition to the power plant. These additions are keeping hundreds of men employed and when completed will enable the company to add several hundred more men to the payroll.

Dealers Exhibit at Farm Show—The first aggressive display of motor cars for the country trade ever shown in New Orleans was on exhibition last week during the National Farm and Live Stock Show. The following companies had booths on the grounds for showing the cars named: The Stout Motor Co., Saxon; the Fairchild Motor Car Co., Dodge, Peerless, Chandler and Federal trucks; F. J. Heinberger, Cole; Woodring-Hamilton Co., Chevrolet and Velie; M. Bell's Son, Inc., Marmon; Edward R. Greenlaw, Republic and Duplex trucks; the White Co., White; Forschler Motor Truck Mfg. Co., Forschler trucks; W. P. Parkhouse Auto Co., Chalmers; Capital City Auto Co., Studebaker; Hal Motor Sales Co., Hal; M. Zilberman, Oldsmobile; Shuler Rubber & Supply



MUSIC HELPS FACTORY TEACH ALIENS.—Recently the Goodyear Co., to ascertain the effect of music in stirring up enthusiasm and stimulating interest in the alien classes, began to devote a few minutes each day to the singing of American patriotic songs. The men join in heartily in singing "America" and other patriotic songs. Occasionally a young woman from the office is asked to sing for the class a few minutes before the opening. The aliens in the Goodyear School represent eighteen different nationalities.

Co., accessories and Firestone tires; Interstate Electric Co., Ajax tires.

Overland Branch for Winnipeg—The enormous increase in the sale of Willys-Knight and Overland cars at Winnipeg, Man., has made necessary a factory branch at Winnipeg to take care of the retail trade, including service to owners, and also to take care of wholesale trade with dealers in the prov-

ince of Manitoba. The branch will maintain a stock of parts adequate to meet the demand in Winnipeg and Manitoba. A temporary showroom, office and service station has been secured and is now open. The new branch will be open for business about Feb. 1.

New Truck Agency Formed—The J. B. Howard Motor Sales Co., St. Louis, has been organized to sell the Dixie Flier and the Old Hickory truck in Missouri and southern Illinois. J. B. Howard, president and manager of the new company, has been a motor car salesman out of St. Louis for 13 years.

Displays First Truck at Show—The Forschler Motor Truck Mfg. Co., Inc., New Orleans, made its first display of 1- and 2-ton trucks built in the plant of the former Forschler Wagon & Mfg. Co. at the recent national farm and live stock show in New Orleans. The company was organized June 6 with a capital of \$500,000.

Knight Tires in Merger—The stockholders of the Knight Tire and Rubber Co., Canton, O., have voted the sale of the entire assets of the company to the Fabrikoid Co., which is a consolidation of New York, Chicago and St. Louis capitalists, and will have a capitalization of \$20,000,000. The concern will manufacture tires at Canton and other points and plans to double the capacity of the Canton plant.

Resigns to Develop Tractor—H. M. Leonard, chief engineer of the Duplex-Power Car Co., Charlotte, Mich., has resigned to develop an invention of a four-wheel-drive farm tractor. The L. M. H. Development Co. has been formed as a holding company with a capital of \$30,000 to build the demonstrating tractors. Another company is to be organized about July 1, 1917, for the manufacture of the tractor. The invention is said to have four

Increases in Capital

Cincinnati Automobile Club—The Cincinnati Automobile Club has increased its capital from \$25,000 to \$50,000.

Winton Co.—The Winton Co., Cleveland, O., has increased its capital from \$1,000,000 to \$2,500,000.

HAL Motor Car Co.—The HAL Motor Car Co., Cleveland, O., has increased its capital from \$1,000,000 to \$2,000,000.

Acme Carbureter & Mfg. Co.—The Acme Carburetor & Mfg. Co., Dayton, O., has increased its capital from \$10,000 to \$15,000.

Kent Motors Corp.—The Kent Motors Corp., New York, has increased its capital from \$100,000 to \$2,000,000.

The Marvel Accessories Mfg. Co.—The Marvel Accessories Mfg. Co., Cleveland, O., has increased its capital from \$10,000 to \$100,000.

Firestone Tire and Rubber Co.—The Firestone Tire & Rubber Co., Akron, O., has increased its capital from \$4,000,000 to \$15,000,000.

Kelly-Springfield Motor Truck Co.—The Kelly-Springfield Motor Truck Co., Springfield, O., has increased its capital from \$3,014,000 to \$6,000,000.

speeds both backward and forward, to turn in a circle with a radius equal to its wheel-base, to pull three plows, to weigh 3,200 lb. and to sell for \$800. Work already has begun on making demonstration models.

New Truck Company Buys Site—The Winther Motor Truck Co., a new organization with a capital of \$330,000, has purchased land near Kenosha, Wis., and expects to be ready for business by the middle of April.

Four-Wheel Drive Adding—The Four-Wheel Drive Auto Co., Clintonville, Wis., which has been erecting large additions to its factory all year, now is erecting a solid brick warehouse, 40 by 100 ft., for storing rough castings.

Chapman Wins \$400,000 Suit—Henry S. Chapman has been awarded a verdict of \$375,000 and interest, making a total of \$412,812, by a jury in a war order suit against the Peerless Motor Car Co., Cleveland, O. Chapman sued for \$800,000, claiming that the Peerless company had violated a contract under which he went to London to sell motor trucks to the British war department.

Valveless Motor Company Erects Plant—The Universal Valveless Four-Cycle Motor Co. is erecting a plant at Muskegon, Mich., and shortly will begin the manufacture of an internal combustion motor of valveless type. The company is incorporated with a capital of \$250,000. The motor was invented by L. F. Clark, who is connected with the Dupont Powder Co.

Nash Sales Managers Confer—Seventy-five sales managers and sales representatives of the Nash Motors Co. assembled at the factory in Kenosha, Wis., recently for a 2-day sales convention. Announcement was made that no new Jeffery models will be marketed before July 1, 1917, the present types being carried forward without change, except for minor refinements, until at least the middle of the coming year.

Labor Scarce at Beaver Dam—Only a continued acute shortage of skilled foundry labor is restricting the desired extension of operations by the Western Malleables Co., Beaver Dam, Wis., which some time ago added a department for the production of castings for the motor car and tractor industry. The company owns three large foundries, two of which are operating at full capacity. One furnace in the third plant was lighted during the last week, but only one or two heats a day can be taken because there are not enough men available to handle the work. **Gillette Tire Equipping Plant**—The first shipments of machinery and other equipment for the new plant of the Gillette Safety Tire Co., Eau Claire, Wis., have arrived and are now being installed. The initial installation is that of a fabric drier, purchased through the Adamson Machine Co., Akron, O., from the

Textile Co., of Providence, R. I. Other machines are being set in place as rapidly as they are delivered, and it is possible that first operations will be possible shortly after December 1, with the entire works operating by January 1.

Auto Body Increases Space—The Auto Body Co., Lansing, Mich., is erecting ten additional dry kilns which will make a total floor space of 10 acres occupied by the company for the manufacture of its products. The kilns will cover ground 99 by 165 ft., which the company recently purchased.

Reorganization Plans Consummated—Final steps in the perfection of the new organization of the A. O. Smith Co., Milwaukee, Wis., as the A. O. Smith Corp., were taken last week when papers were filed in the office of the secretary of state of Wisconsin, transferring all of the capital stock of the new corporation from Eddyville, N. Y., to Milwaukee. The transaction involves the transfer of \$3,500,000, and the company paid a fee of \$3,500 to the state.

Atlas Increases Capital—The Atlas Drop Forge Co., Lansing, Mich., has increased its capitalization from \$200,000 to \$500,000. A 100 per cent stock dividend is being issued to all stockholders and \$100,000 will be held as treasury stock. The company was formed in 1906 with capital of \$100,000, which was doubled in 1911. The plant is now producing to the limits of its capacity and according to present indications will manufacture \$1,250,000 worth of products for the coming year.

Briscoe Assembly Plant in West—The Briscoe Motor Corp., Jackson, Mich., will erect an assembly plant at a cost of approximately \$500,000 at one of the larger cities on the Pacific coast. Benjamin Briscoe, president, and L. E. Wilson, vice-president of the corporation, will leave for California in the next few days and will determine the exact location of the new plant on their arrival. The Briscoe factory is reaching out after business on the western coast of South America, as well as Australia, New Zealand, Japan and Russia, and plans to have a plant with a capacity for assembling 20,000 cars year.

Tire Protector in New Plant—The Bukolt Tire Protector Co., Stevens Point, Wis., is taking occupancy of its new factory, made possible by the completion of a new establishment for the Automatic Cradle Mfg. Co., a Bukolt interest, which releases several thousand square feet of manufacturing space. The output of steel tire protectors will be increased from fifty pairs a day to 300 pairs. The tire protector business will be incorporated as soon as possible and will have a capitalization of about \$200,000. Six new jobbers have been added to the sales organ-

ization in recent weeks and it is said that the company could easily market 500 pairs of protectors daily if the facilities were at hand.

Kenworthy Heads Chicago Roamer—C. H. Kenworthy has been made manager of the Chicago branch of the Barley Motor Car Co., marketing the Roamer.

Ruthenburg Dayton Superintendent—Louis Ruthenburg has been appointed general superintendent of the Dayton Engineering Laboratories Co., Dayton, O., W. P. Anderson having resigned to go in business for himself.

Morrison With Maxwell—A. E. Morrison has joined the staff of the Maxwell Motor Co., Detroit, as special sales representative. Mr. Morrison was formerly branch manager on the Pacific coast for the Hupp Motor Car Corp.

Brooks With Madison Motors—H. H. Brooks has been appointed superintendent of agencies for the Madison Motors Corp., Detroit, Mich. Mr. Brooks was formerly sales and advertising manager for the Pontiac Chassis Co.

Small, Franklin Engineer—W. C. Small, for 2 years traveling engineer in the Pacific coast territory for Franklin, has been appointed engineer in charge of inspection at the factory. F. D. Hutchinson succeeds him in the Pacific coast territory.

Hearn Tire to Kelly—The Hearn Tire & Rubber Co., Columbus, O., of which the late W. H. Hearn was proprietor, has been succeeded by the Kelly-Springfield Tire Co., which has established a direct factory branch at the former location. Homer Wright has been installed as manager.

C. W. Warren Killed—Charles Walter Warren, assistant to the president of the Cutler-Hammer Mfg. Co., Chicago, was killed last week when a motor car in which he was riding from Detroit to Chicago overturned near Butler, Ind. Mr. Warren was killed instantly.

K. F. Peterson Dies—K. Franklin Peterson, Chicago, who was one of the first manufacturers' agents in this country handling car parts, died last week. Mr. Peterson was one of the pioneers in the motor car trade here, having handled Brown-Lipe transmissions and Continental motors almost from the time these units of motor car construction came into use.

Maxwell Declares Dividend—The Maxwell Motor Co. has declared a regular quarterly dividend of 2½ per cent on the common stock, payable January 2. Dividends on the first and second preferred were declared at the same time. The company announces that a large contract for all its steel supplies until July 1, 1917, has been closed at considerably below current prices.

Recent Incorporations

Brookings, S. D.—Brictson Mfg. Co.; to manufacture steel studded leather motor car treads; capital stock, \$10,000,000; incorporators, G. J. Flittee, H. F. Harraldson and O. A. Brictson.

Cincinnati, O.—Morris Motor Mart Co.; capital stock, \$20,000; to sell motor cars; incorporators, D. C. Outcat, Joseph Lemkuhl, Chas. G. Morris, Chas. T. Ryan and Dudley R. Howard.

Cincinnati, O.—McQuiston Auto Co.; capital stock, \$25,000; to sell motor cars; incorporators, H. P. McQuiston, E. B. Larkin, U. B. Gillett, Chas. T. Ryan and C. R. Outcat.

Cleveland, O.—Standard Parts Co.; capital stock, \$10,000; to manufacture and deal in parts; incorporators, Benj. A. Gage, W. D. Wilkin, Luther Day and Chas. S. Wachner.

Columbus, O.—Monitor Motor Car Co.; capital stock, \$10,000; to manufacture motor cars; incorporators, Charles C. Cummings, F. S. Cummins, John W. Zuber, P. O. Johnson and C. Flynn.

Dayton, O.—Kinsey Motor Car Co.; capital stock, \$10,000; to sell motor cars; incorporators, R. W. Kinsey, H. M. Maudsley, Samuel S. Ankney, Howard B. Arnold and Alfred McCray.

Evansville, Ind.—International Rubber Sales Co.; capital stock, \$10,000; incorporators, Marc Wile, Leah Wile and A. D. Rodgers.

Fort Wayne, Ind.—Anthony Auto Lifter Co.; capital stock, \$10,000; incorporators, C. O. Blee, W. O. Chaney and G. F. Seymour.

Fort Wayne, Ind.—Ploeger Motor Car Co.;

ganized to engage in rubber goods; incorporators, G. F. Kreitlein, C. W. Mineisinger and W. W. Kuhn.

Iowa City, Ia.—Stephens Auto Distributing Co.; capital stock, \$10,000; incorporators, O. P. Murphy, C. G. McCauley, A. C. Moyer and Ray Blakesley.

Los Angeles, Cal.—Leach Motor Car Co.; capital stock, \$25,000; incorporators, C. F. Smith and L. S. Skelton.

Memphis, Tenn.—Seven-Eighty-Five Taxi and Auto Co.; capital stock, \$15,000; incorporators, John J. Collins, Bertie C. Peterson, Simon G. Peterson, Frank Sturia and Phil M. Canale.

Newark, N. J.—Reuter Puncture Proof Tire & Tube Co.; to manufacture and deal in tubes and tires; capital stock, \$125,000; incorporators, Alfred Strauss, G. J. Reuter, L. R. Freund, A. M. Herman.

Pierre, S. D.—Menno Auto Supply Co.; capital stock, \$15,000; incorporators, J. W. Ulmer, Carl Goehring, John D. Schuenk.

Pittsburgh, Pa.—Greater Avenue Garage Co.; capital stock, \$15,000; incorporators, W. P. Gettman, A. W. Springer and J. L. Feerst, Jr.

Pittsburgh, Pa.—Bakewell Motor Car Co.; capital stock, \$50,000; incorporators, Frank S. Delf, G. L. Walter, Jr., G. M. Metz.

Santa Fe, N. M.—Dona Ana Motor Co.; capital stock, \$50,000; incorporators, A. F. Katzenstein, Jr., F. W. Campbell.

Toledo, O.—Erie Auto Eng. Co.; capital stock, \$10,000; incorporators, J. H. Yonker and F. Kemp.

capital stock, \$15,000; incorporators, Edward W. Ploeger, H. W. Ploeger, H. F. Ploeger.

Fort Worth, Tex.—De Luxe Motor Co.; capital stock, \$15,000; incorporators, J. E. Mitchell, W. T. Simmons and T. B. Van Tuyl.

Harrisburg, Pa.—Point Motor Sales and Service Co.; capital stock, \$10,000; incorporators, L. G. Carlin, M. J. Spaun and Alwina M. Oliver.

Indianapolis, Ind.—Fred P. O'Brien Motor Co.; capital stock, \$25,000; incorporators, Fred P. O'Brien, Mary E. O'Brien, Thomas H. Mullins.

Indianapolis, Ind.—Meixell Co., to buy and sell motor cars; capital stock, \$10,000; incorporators, B. F. Meixell, T. E. Madden, T. J. Gannon.

Indianapolis, Ind.—Guarantee Tire and Rubber Co.; capital stock, \$70,000; has been or-